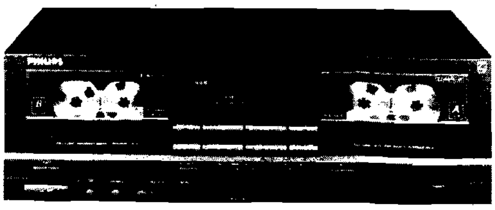
PHIL-04186

Cassette deck 70FC660/00R

Service
Service
Service



Service Manual

GB

The apparatus **70FC660/00R** is identical with the apparatus 70FC650/00R
Difference:
Additionally there is a remote control bus socket at the rear of the apparatus. New rear panel pos.514
For the modified circuit diagram and the P.C.B see the fig. 1.
RC socket codenumber 4822 265 20401
T 436 (BC558B) codenumber 4822 130 44197
T 416 (BC548B) codenumber 4822 130 40937
New front panel pos. 422 codenumber 4822 443 40915.

For parts and technical data see the Service Manual of the 70FC650/00R (codenumber 4822 725 22584)

F

Les appareils **70FC660/00R** et 70FC650/00R sont similaires.
Modifications:
Raccordements Remote-Controle-Bus supplèmentaires à l'arrière de l'appareil. Modification boîtier arrière pos. 514. Pour la modification du circuit voir fig. 1.
Prises RC: rèf. 4822 265 20401
T 436 (BC558B): rèf. 4822 130 44197
T 416 (BC548B): rèf. 4822 130 40937
Modification boîtiér avant pos. 422: rèf. 4822 443 40915.

Pour les et caractéristiques techniques consulter les Instructions de Service du 70FC650/00R (rèf. 4822 725 22584).

NL

De **70FC660/00R** is gelijk aan de 70FC650/00R
Wijziging:
Aan de achterzijde van het apparaat is een remote control aansluitbus toegevoegd. Achterwand pos 514 is gewijzigd.
Voor gewijzigd principeschema zie fig 1.
RC-aansluitbus Kodenummer 4822 256 20401
T436 (BC558B) Kodenummer 4822 130 44197
T416 (BC548B) Kodenummer 4822 130 40937
Nieuw front pos 422 Kodenummer 4822 443 40915.

Voor onderdelen en technische gegevens zie de Service Manual van de 70FC650/00R Kodenummer 4822 725 22584.

D

Das Gerät **70FC660/00R** ist dem Gerät 70FC650/00R gleich.
Änderung:
Zusätzlich Remote-Control-Bus-Anschlüsse an der Geräterückseite. Neue Rückwand pos. 514.
Schaltungsänderung siehe Fig. 1.
RC-Buchsen Kodenummer 4822 265 20401
T 436 (BC558B) Kodenummer 4822 130 44197
T 416 (BC548B) Kodenummer 4822 130 40937
Neue Frontblende pos.422 Kodenummer 4822 443 40915.

Für Bauteile und Technische Daten siehe das Service Manual des 70FC650/00R (Kodenummer 4822 725 22584)

I

Il **70FC660/00R** è identico al 70FC650/00R.
La modifica riguarda i collegamenti Remode-Control-Bus sul lato posteriore dell'apparecchio. Pannello poster. pos. 514 modificato.
Vedere il circuito riportato sul retro (fig.1).
Prese RC No. 4822 265 20401
T 436 (BC 558 B) No. 4822 130 44197
T 416 (BC 548 B) No. 4822 130 40937
Nuova mascherina frontale pos. 422 No. 4822 443 40915

Per i componenti e ei caratteristiche tecniche vederc il Service Manual del 70FC650/00R (No. 4822 725 22584)

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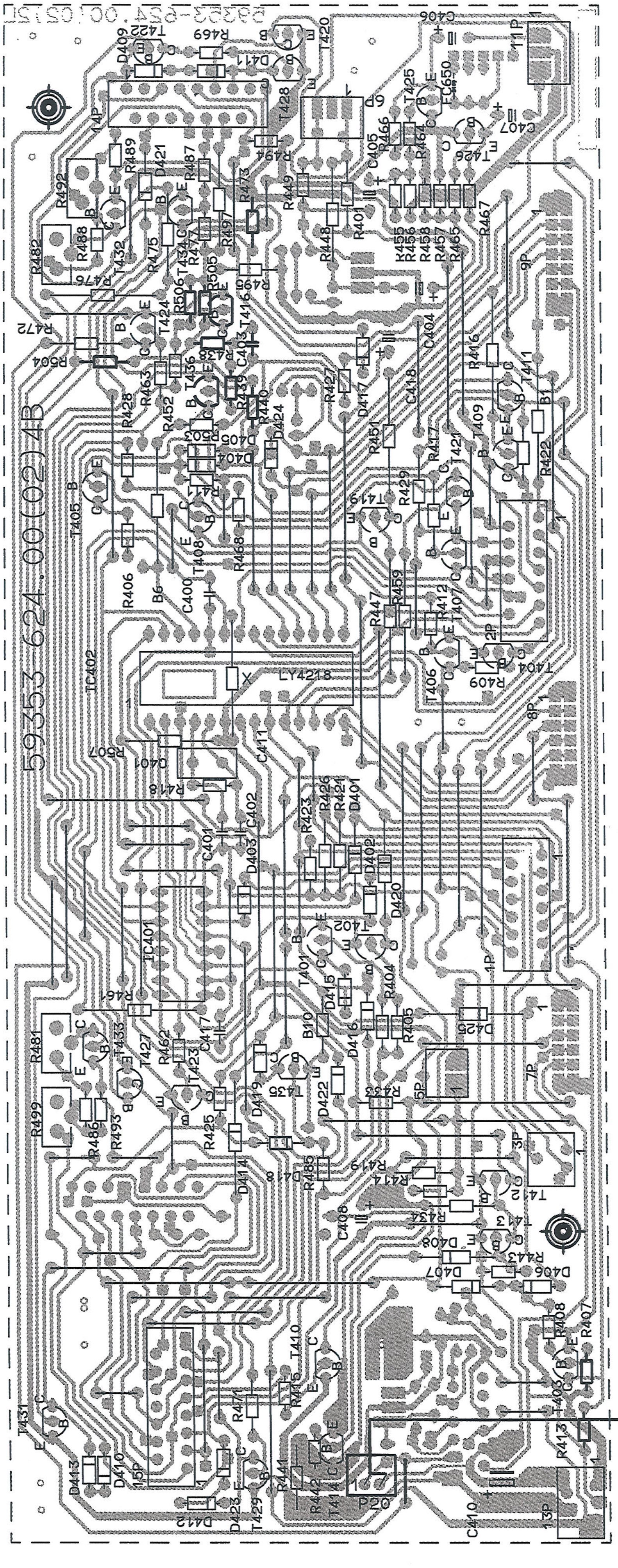
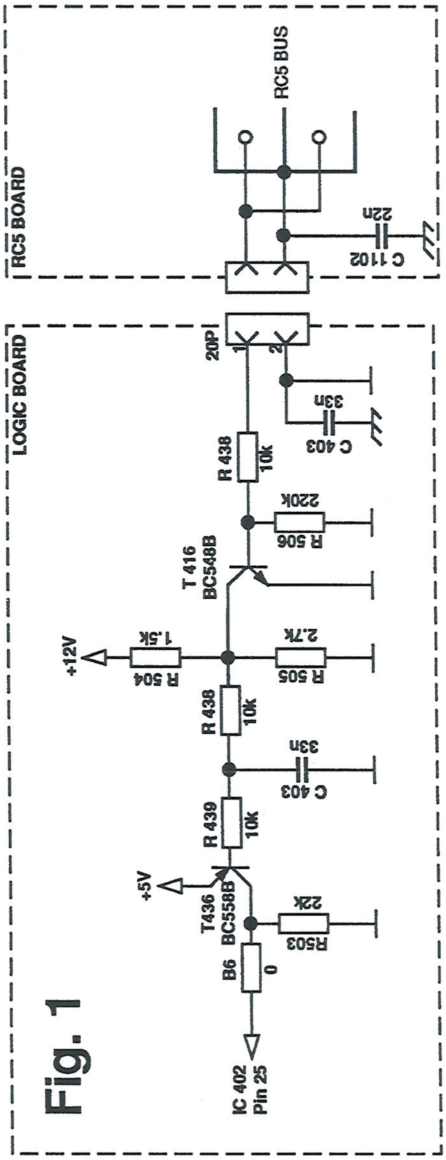
CS 28 164

Logic panel

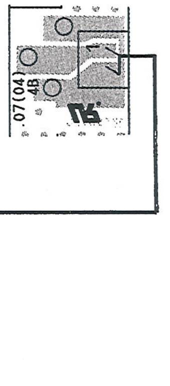


59353 624.00(02)4B
LY4218
IC402
IC401



RC5 BOARD
RC5 BUS
C 1102
22n
LOGIC BOARD
20P
C 403
33n
R 438
10k
R 506
220k
T 416
BC548B
+12V
R 504
1.5K
R 505
2.7K
R 439
10k
+5V
T436
BC558B
R503
22k
B6
0
IC 402
Pin 25

Fig. 1



RC - 5

Cassette deck 70FC650/00R

Service
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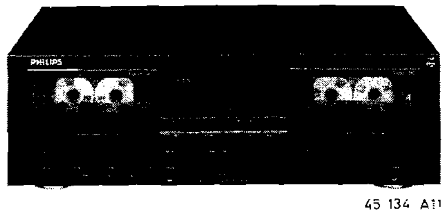

For repair information of the cassette mechanism see Service Manual of "Recorders tape deck CFE, CRD" versions CFE 403/03 (deck A) and CRD 416 (deck B)

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Service Manual

SPECIFICATION

	Nominal value	Typical value	
Mains voltage	220 V~	220 V~	
Mains frequency	50-60 Hz	50-60 Hz	
Power consumption	20 W max.	20 W max.	
Dimensions (W×H×D)	420×134×260 mm	420×120/134×260 mm	
Weight	5 kg	5 kg	
Cassette system	compact cassette	compact cassette	
Number of tracks	2 x 2 (stereo)	2 x 2 (stereo)	
Tape speed	4.76 cm/sec	4.76 cm/sec	
Speed deviation	± 2% (DIN)	± 1.5%	
Speed tolerance between 2 decks	± 1.5%	± 1%	
Wow and flutter (weighted)	⩽ 0.3% (DIN)	0.15% (DIN) ⩽ 0.05% (WRMS)	
Fast-wind time (C60)	⩽ 140 sec (A) ⩽ 100 sec (B)	⩽ 100 sec	
Bias and erase frequency	85 kHz ± 10%	85 kHz ± 10%	
Frequency range	DIN 45500:	IEC:	NAB:
Metal-type IV	40-14.000 Hz	30-16.000 Hz	30-17.000 Hz
Chromium-type II	40-14.000 Hz	30-16.000 Hz	30-17.000 Hz
Normal-type I	40-13.000 Hz	30-14.000 Hz	30-15.000 Hz
Signal/noise (without dolby)	DIN 45500:	DIN 45500:	NAB:
Metal	⩾ 52 dB	57 dB	58 dB
Chromium	⩾ 54 dB	57 dB	58 dB
Normal	⩾ 52 dB	56 dB	57 dB
Improvement with dolby B	⩾ 8.5dB (CCIR)	10 dB (at 5 kHz)	
Improvement with dolby C	⩾ 18 dB (CCIR)	20 dB (at 1kHz)	
Distortion (K3)	⩽ 3%	⩽ 2%	
Input sensitivity			
Microphone	0.56 mV at 2 kΩ	0.56 mV at 2 kΩ	
Line input cinch	180 mV at 50 kΩ	70 mV at 40 kΩ	
Outputs			
Line output, Cinch	$\geqslant 0.82\ V/Z_0 < 2\ k\Omega$	$\geqslant 0.5\ V/Z_0 < 2\ k\Omega$	
Headphones impedance	8-600 Ω	8-600 Ω	

CONTROLS AND CONNECTIONS

1 ON/OFF switch
2 Eject button deck B
3 Cassette holder B
4 Deck B selector button
5 Rewind button
6 Play button
7 Zero reset button
8 Stop button
9 Display
10 Pause button
11 Reverse mode select button
12 Wind button
13 Deck A selector button
14 Continuous play mode button
15 Cassette holderA
16 Headphone socket
17 Eject button deck A
18 Dolby NR an B/C buttons
19 Dubbing speed buttons
20 Recording/Recording mute button
21 Microphone socket
22 Recording level control
23 Recording balance control
24 Timer selector switch

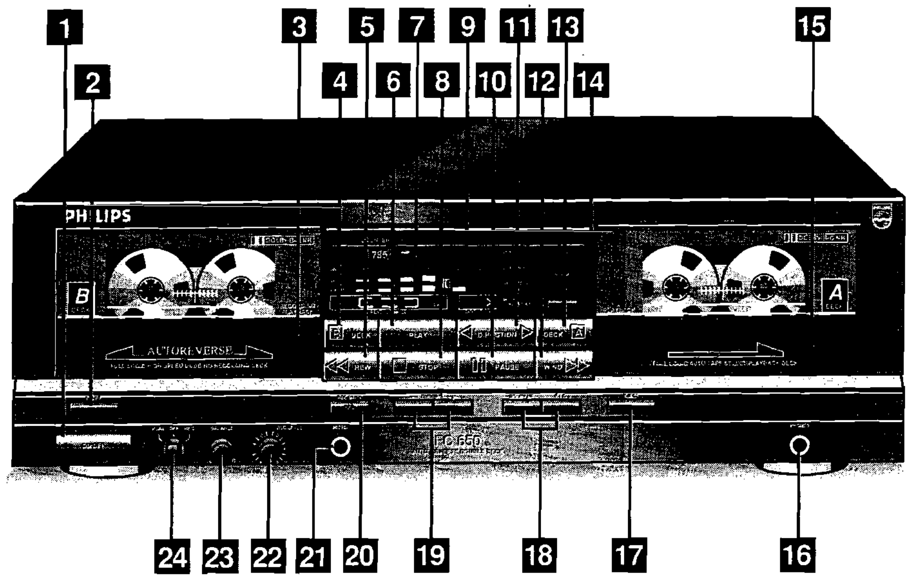

Fig. 1

(GB) SERVICE TEST PROGRAM

The microprocessor in the digital operating part contains a test program which can be divided into the following sections:

1. Display test
2. Keyboard test
3. ROM code
4. RAM test

Note: The RAM test should be carried out last because no other tests can be called up from the RAM test.

Switching on test program:

The unit can be set in test mode by pressing keys "DECK A" and "DECK B" at the same time and holding them depressed and then switching on the power switch.
As long as the keys "DECK A" and "DECK B" are depressed, you are in the test mode "Display test" (see section 1). After the two keys are released, you are in the basic test program.
The following LEDs will now be lit: DECK B, >, ⇆.

Note: The test program does not start up if the microprocessor is defective or a number of basic conditions are not fulfilled.
Thus, in the case of a supposed defect in the operating part, first check the supply voltage, function keys DECK A and DECK B, the clock signal and the reset pulse.

Switching off test program

You can only exit from the test program by switching the unit off and on or by briefly earthing pin 24 (Reset pin) of the microprocessor.

1. Display test
The Display test program can be called up by pressing at the same time keys "DECK A" and "DECK B" from the basic test program. The following LEDS will light up:

LED: DECK A
REC
CD SYNCHRO
⇆ ⊐
DIR <
HIGH

2. Key test
When a function key is pressed, an LED or combination of LEDs will light up on the display (see table 1).

3. ROM code
By pressing keys "Dubbing NORMAL" and "DECK A" at the same time, the ROM code becomes visible. This is indicated by an LED combination (see table 2).

4. RAM test
The RAM test can be called up by pressing the keys "DIRECTION" and "STOP" at the same time. If the result of the RAM test is positive, the "DECK A" and "DECK B" LEDs will start to flash. If a defect is found in a RAM cell, the unit will exit from the test program and return to Normal mode.

Note: The RAM test should be carried out last because no other test can be called up from the RAM test.
Exit from the test program by switching the unit off and on or by briefly earthing pin 24 (Reset pin) of the microprocessor.

(NL) SERVICE TI

De microprocessoı
bevat een testprog
de volgende hoofd
1. Display test
2. Key board te
3. ROM-code
4. RAM-test
Opmerking:
De RAM-test dient
omdat men van de
kan aanroepen.

Inschakelen testp

Het apparaat kan i
gelijktijdig de toets
drukken en vast te
voedingsschakela
Zolang de toetsen
gehouden bevindt
(zie hoofdstuk 1).
Na het loslaten va
testprogramma.
De volgende LEDS

Let op:
Het testprogramm
microprocessor de
basisvoorwaarden
eerst bij een verm
de voedingsspanni
B, het clocksignaa

Uitschakelen test

Het testprogramm
uit- en inschakelen
(Reset-pin) van de
massa te leggen.

1. Display test
Het display-test
door vanuit het
A" en "Deck B"
De volgende LE

LED: DECK A
REC
CD SYNC
⇆ ⊐
DIR <
HIGH

2. Key test
Bij het indrukke
display een LE
oplichten (zie ta

3. ROM-code
Door het gelijkt
"Dubbing NOR
zichtbaar gema
LED-combinatie

4. RAM-test
De RAM-test k
toetsen "DIREC
drukken. Wann
zullen de LEDS
Wanneer een d
aangetroffen za
gaan en in de n

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PHIL-04081/ DRUCK 2

CONTROLS AND CONNECTIONS

1 ON/OFF switch
2 Eject button deck B
3 Cassette holder B
4 Deck B selector button
5 Rewind button
6 Play button
7 Zero reset button
8 Stop button
9 Display
10 Pause button
11 Reverse mode select button
12 Wind button
13 Deck A selector button
14 Continuous play mode button
15 Cassette holderA
16 Headphone socket
17 Eject button deck A
18 Dolby NR an B/C buttons
19 Dubbing speed buttons
20 Recording/Recording mute button
21 Microphone socket
22 Recording level control
23 Recording balance control
24 Timer selector switch

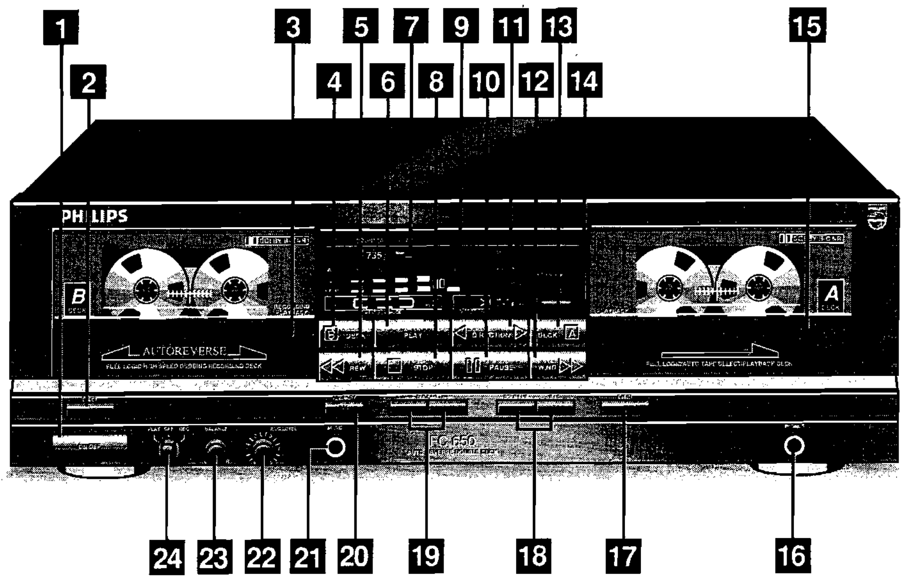


Fig. 1

(GB) SERVICE TEST PROGRAM

The microprocessor in the digital operating part contains a test program which can be divided into the following sections:

1. Display test
2. Keyboard test
3. ROM code
4. RAM test

Note: The RAM test should be carried out last because no other tests can be called up from the RAM test.

Switching on test program:

The unit can be set in test mode by pressing keys "DECK A" and "DECK B" at the same time and holding them depressed and then switching on the power switch.
As long as the keys "DECK A" and "DECK B" are depressed, you are in the test mode "Display test" (see section 1). After the two keys are released, you are in the basic test program.
The following LEDs will now be lit: DECK B, >, ⇆.

Note: The test program does not start up if the microprocessor is defective or a number of basic conditions are not fulfilled.
Thus, in the case of a supposed defect in the operating part, first check the supply voltage, function keys DECK A and DECK B, the clock signal and the reset pulse.

Switching off test program

You can only exit from the test program by switching the unit off and on or by briefly earthing pin 24 (Reset pin) of the microprocessor.

1. **Display test**
The Display test program can be called up by pressing at the same time keys "DECK A" and "DECK B" from the basic test program. The following LEDS will light up:

LED: DECK A
REC
CD SYNCHRO
⇆ ⊐
DIR <
HIGH

2. **Key test**
When a function key is pressed, an LED or combination of LEDs will light up on the display (see table 1).

3. **ROM code**
By pressing keys "Dubbing NORMAL" and "DECK A" at the same time, the ROM code becomes visible. This is indicated by an LED combination (see table 2).

4. **RAM test**
The RAM test can be called up by pressing the keys "DIRECTION" and "STOP" at the same time. If the result of the RAM test is positive, the "DECK A" and "DECK B" LEDs will start to flash. If a defect is found in a RAM cell, the unit will exit from the test program and return to Normal mode.

Note: The RAM test should be carried out last because no other test can be called up from the RAM test.
Exit from the test program by switching the unit off and on or by briefly earthing pin 24 (Reset pin) of the microprocessor.

(NL) SERVICE TEST PROGRAMMA

De microprocessor in het digitaal bedieningsgedeelte bevat een testprogramma welk opgedeeld kan worden in de volgende hoofdstukken:

1. Display test
2. Key board test
3. ROM-code
4. RAM-test

Opmerking:
De RAM-test dient als laatste test te worden uitgevoerd, omdat men van de RAM-test uit geen andere test meer kan aanroepen.

Inschakelen testprogramma:

Het apparaat kan in de testmode worden gezet door gelijktijdig de toetsen "DECK A" en "DECK B" in te drukken en vast te houden en daarna de voedingsschakelaar in te schakelen.
Zolang de toetsen "Deck A" en Deck B" ingedrukt worden gehouden bevindt men zich in test mode "Display test" (zie hoofdstuk 1).
Na het loslaten van beide toetsen komt men in het basis testprogramma.
De volgende LEDS zullen nu branden: DECK B, >, ON, ⇆.

Let op:
Het testprogramma wordt niet opgestart als de microprocessor defect is, of als niet aan enkele basisvoorwaarden wordt voldaan. Controleer dan ook eerst bij een vermeend defect in het bedieningsgedeelte de voedingsspanning, funktie toetsen DECK A en DECK B, het clocksignaal en de reset puls.

Uitschakelen testprogramma

Het testprogramma kan alleen verlaten worden door het uit- en inschakelen van het apparaat of door pin 24 (Reset-pin) van de microprocessor kortstondig aan massa te leggen.

1. **Display test**
Het display-testprogramma kan worden aangeroepen door vanuit het basistestprogramma de toetsen "Deck A" en "Deck B" samen in te drukken.
De volgende LEDS zullen oplichten:

LED: DECK A
REC
CD SYNCHRO
⇆ ⊐
DIR <
HIGH

2. **Key test**
Bij het indrukken van een funktietoets zal in het display een LED of een combinatie van LEDS oplichten (zie tabel 1)

3. **ROM-code**
Door het gelijktijdig indrukken van de toetsen "Dubbing NORMAL" en "DECK A" wordt de ROM-code zichtbaar gemaakt. Deze wordt door een LED-combinatie aangegeven (zie tabel 2).

4. **RAM-test**
De RAM-test kan worden aangeroepen door de toetsen "DIRECTION" en "STOP" gelijktijdig in te drukken. Wanneer de RAM-test positief verlopen is zullen de LEDS "DECK A" en "DECK B" gaan knipperen. Wanneer een defect in een RAM cel wordt aangetroffen zal het apparaat uit het testprogramma gaan en in de normal-mode terug keren.

Opmerking:
De RAM-test dient als laatste test te worden uitgevoerd, omdat men van de RAM-test uit geen andere test meer kan aanroepen.

Testprogramma verlaten door het uit- en inschakelen van het apparaat of door pin 24 (Reset-pin) van de microprocessor kortstondig aan massa te leggen.

Table 1

KEY	LED
Dubbing NORMAL	NOR
Dubbing HIGH	HIGH
Cont. play MODE	⊐
CD synchro	▬ (CD SYNCHRO)
DIRECTION	<
PAUSE	REC + HIGH
≪ REW	REC + <
STOP	⊐ + HIGH
F.FWD ≫	REC + NOR
PLAY	REC + ⊐ + <
Rec. Mute REC	REC + ⊏ ⊐ CONT.PLAY

Table 2

VERSION	LED
Version 1	DECK A + HIGH
Version 2	DECK A + REC
Version 3	DECK A + REC + HIGH

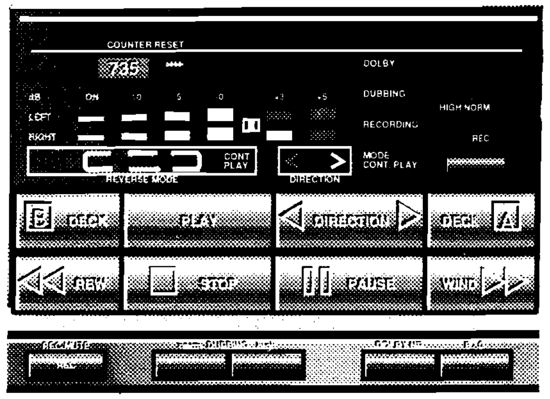


Fig. 2

Ⓓ SERVICE PRÜFPROGRAMM

Der mikroprozessor im digitalen Bedienungsteil enthält ein Prüfprogramm, das sich in folgende Abschnitte aufteilt:

1. Display-Prüfung
2. Tastatur-Prüfung
3. ROM-Code
4. RAM-Prüfung

Hinweis: Da es nicht möglich ist, vom RAM-Prüfabschnitt aus einen anderen Prüfabschnitt aufzurufen, muss die RAM-Prüfung als letzte durchgeführt werden.

Einschalten des Prüfprogramms

Der Prüfmodus des Geräts wird durch gleichzeitiges Gedrückthalten der Tasten "DECK A" und "DECK B" und Drücken des Netzspannungsschalters aufgerufen. Solange die Tasten "DECK A" und "DECK B" gedrückt bleiben, ist der Prüfmodus "Display-Prüfung" eingeschaltet (siehe Abschnitt 1). Durch Loslassen beider Tasten gelangt man in das eigentliche Prüfprogramm. Es sollten jetzt folgende LEDs leuchten: DECK B, >, ON, ⇌.

Achtung: Das Prüfprogramm läuft nicht, wenn der Mikroprozessor defekt ist oder einige wichtige Voraussetzungen nicht erfüllt sind.
Daher bei einem vermeintlichen Defekt im Bedienungsteil zunächst die Netzspannung, die Funktionstasten "Deck A" und "Deck B", das Taktsignal und den Nullimpuls überprüfen.

Ausschalten des Prüfprogramms

Das Prüfprogramm kann nur verlassen werden, indem das Gerät aus- und eingeschaltet wird oder indem Stift 24 (RESET-Stift) des Mikroprozessors kurzzeitig an masse gelegt wird.

1. Display-Prüfung
Aufrufen des Display-Prüfabschnitts vom eigentlichen Prüfprogramm aus durch Drücken der Tasten "DECK A" und "DECK B".
Folgende LEDs müssen aufleuchten:

LED: DECK A
REC
CD SYNCHRO
⊏⊐
DIR <
HIGH

2. Tastatur-Prüfung
Nach Drücken einer Funktionstaste leuchten im Display eine oder mehrere LEDs auf (siehe Tabelle 1).

3. ROM-Code
Aufrufen des ROM-Codes durch gleichzeitiges Drücken der Tasten "Dubbing NORMAL" und "Deck A". Der Code wird durch eine LED-Kombination angezeigt (siehe Tabelle 2).

4. RAM-Prüfung
Aufrufen der RAM-Prüfung durch gleichzeitiges Drücken der Tasten "DIRECTION" und "STOP".
Bei positivem Ergebnis der RAM-Prüfung beginnen die LEDs "DECK A" und "DECK B" zu blinken.
Bei einem Defekt in einem RAM verlässt das Gerät das Prüfprogramm und schaltet zurück in den normalen Betriebszustand.

Hinweis: Das es nicht möglich ist, vom RAM-Prüfabschnitt aus einen anderen Prüfabschnitt aufzurufen, muss die RAM-Prüfung als letzte durchgeführt werden.
Das Prüfprogramm wird verlassen, indem das Gerät aus- und eingeschaltet wird oder indem Stift 24 (RESET-Stift) des Mikroprozessors kurzzeitig an Masse gelegt wird.

Ⓕ PROGRAMME SERVICE DE TEST

Le microprocesseur de la section numérique de commande comprend un programme de test qui est à subdiviser en chapitres comme suit:

1. Test de l'afficheur
2. Test du clavier
3. Code ROM
4. Test de la RAM

remarque: le test de la RAM doit être éffectué en dernier lieu, car à partir de ce test il n'y a plus moyen d'appeler d'autres tests.

Mise en route du programme de test

L'appareil sera mis au mode de test en gardant appuyées simultanément les touches "DECK A" et "DECK B" et puis par la mise en circuit de l'interrupteur d'alimentaion. Tant que les touches "DECK A" et "DECK B" restent pressées on se trouve au mode de test de l'afficheur (Display Test) - chapitre 1–.
Dès que l'on relâche les deux touches on est au programme de test de base.
Les LED DECK B, >, ON et ⇌ s'allumeront.

Attention: Le programme de test ne démarre pas si le microprocesseur est défectueux ou si certaines conditions n'ont pas été remplies.
Dans ce cas, vérifier d'abord le défaut suspecté dans la section de commande de la tension d'alimentation, les touches de fonctions DECK A et DECK B, le signal d'horloge et l'impulsion de remise à zéro.

Arrêt du programme de test

Quitter le programme de test s'effectue uniquement par la mise en et hors fonction de l'appareil ou en mettant brièvement la broche 24 (de remise à zéro) du microprocesseur à la masse.

1. Test de l'afficheur
Le programme de test de l'afficheur est appelé à partir du programme de base, pressez simultanément les touches "DECK A" et "DECK B". Les LED suivantes s'allumneront:

LED: DECK A
REC
CD SYNCHRO
⊏⊐
DIR <
HIGH

2. Test du clavier
En pressant une des touches de fonction une des LED ou combiné de LED s'allumera (voir tableau 1).

3. Code ROM
Appuyez simultanément sur les touches "Dubbing NORMAL" et "DECK A", le code ROM est alors apparent.
Il se présente sous la forme d'un combiné de LED (voir tableau 2).

4. Test de la RAM
Il y a moyen d'appeler le test de la RAM par pression simultanée des touches "DIRECTION" et "STOP".
Si le résultat du test de la RAM est positif, les LED "DECK A" et "DECK B" s'allumeront.
Si un défaut se révèle dans une section de la RAM, l'appareil quittera automatiquement le programme de test et passera au mode Normal.

Remarque: le test de la RAM doit être excécuté en dernier lieu, car il n'y a plus moyen d'appeler d'autres tests par le suite.
On quittera le programme de test par la mise en et hors fonction de l'appareil ou en mettant brièvement la broche 24 (remise à zéro) à la masse.

Table 1

KEY	LED
Dubbing NORMAL	NOR
Dubbing HIGH	HIGH
Cont. play MODE	⊐
CD synchro	▬ (CD SYNCHRO)
DIRECTION	<
PAUSE	REC + HIGH
≪ REW	REC + <
STOP	⊐ + HIGH
F.FWD ≫	REC + NOR
PLAY	REC + ⊐ + <
Rec. Mute REC	REC + ⊏⊐ CONT.PLAY

Table 2

VERSION	LED
Version 1	DECK A + HIGH
Version 2	DECK A + REC
Version 3	DECK A + REC + HIGH

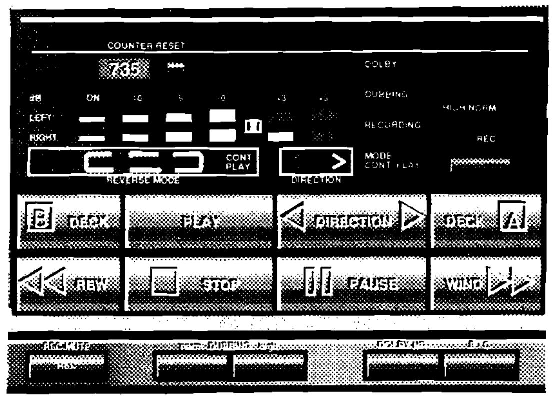


Fig. 2

Ⓘ PROGRAMMA DIAGNOSTICO DI SERVIZIO

Il microprocessore nella parte del comando digitale contiene un porgramma diagnostico che si divide nei seguenti capitoli:

1. test del display
2. test della tastiera
3. codice ROM
4. test del RAM

Oss.: Il RAM test si esegue per ultimo, perché dal RAM test non si può più richiamare nessun altro test.

L'accensione del programma diagnostico:

L'apparecchio si predispone per il modo diagnostico premendo e tenendo premuti simultaneamente i tasti "DECK A" e "DECK B" accendendo quindi l'interruttore di alimentazione.
Finché i tasti "DECK A" e "DECK B" sono tenuti premuti ci si trova nel modo diagnostico "Display test" (vedasi capitolo1). Una volta lasciati ambedue i tasti si passa al programma diagnostico di base,
I seguenti LED lampeggeranno: DECK B, >, ON, ⇌.

Attenzione: Il programma diagnostico non si avvia quando il microprocessore è guasto, o quando non sono rispettate alcune condizioni di base.
Quando si sospetta che ci sia un difetto nella parte del comando è il caso di controllare prima la tensione dell'alimentazione, i tasti funzionali DECK A e DECK B, il segnale dell'orologio e l'impulso di "resettaggio".

Spengimento del programma diagnostico

Si esce dal programma diagnostico semplicemente accendendo e spegnendo l'apparecchio o collegando il bottone 24 (bottone di "resettagio") brevemente alla massa.

1. Display test
Il programma diagnostico del display può essere chiamato premendo dal programma diagnostico di base simultaneamente i tasti "DECK A" e "DECK B". Lampeggeranno i seguenti LED:

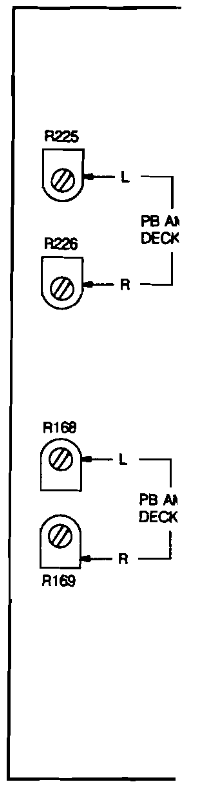
LED: DECK A
REC
CD SYNCHRO
⊏⊐
DIR <
HIGH

2. Key test
Quando si preme un tasto di funzione nel display lampeggerà un LED o combinazione di LED (vedasi tabella 1).

3. Codice ROM
Premendo simultaneamente i tasti "Dubbing NORMAL" e "DECK A" si rende visibile il codice ROM.
E'indicato da una combinazione di LED (vedasi tabella 2).

4. RAM test
Il RAM test si chiama premendo simultaneamente i tasti "DIRECTION" e "STOP".
Nel caso che il RAM test si sia svolto in senso positivo lampeggeranno i LED "DECK A" e "DECK B".
Qualora si riscontrasse un difetto in una cellula RAM l'apparecchio passerà dal programma diagnostico al modo normale.

Oss.: Il RAM test si esegue per ultimo, perché dal RAM test non si può più richiamare nessun altro test.
Per uscire dal programma diagnostico basta accendere o spegnere l'apparecchio o collegare brevemente il bottone 24 (bottone di "resettaggio" alla massa.



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Remarque: le test de la RAM doit être excécuté en dernier lieu, car il n'y a plus moyen d'appeler d'autres tests par le suite.
On quittera le programme de test par la mise en et hors fonction de l'appareil ou en mettant brièvement la broche 24 (remise à zéro) à la masse.

Table 1

KEY	LED
Dubbing NORMAL	NOR
Dubbing HIGH	HIGH
Cont. play MODE	⊐
CD synchro	▬ (CD SYNCHRO)
DIRECTION	<
PAUSE	REC + HIGH
≪ REW	REC + <
STOP	⊐ + HIGH
F.FWD ≫	REC + NOR
PLAY	REC + ⊐ + <
Rec. Mute REC	REC + ⊏ ⊐ CONT.PLAY

Table 2

VERSION	LED
Version 1	DECK A + HIGH
Version 2	DECK A + REC
Version 3	DECK A + REC + HIGH

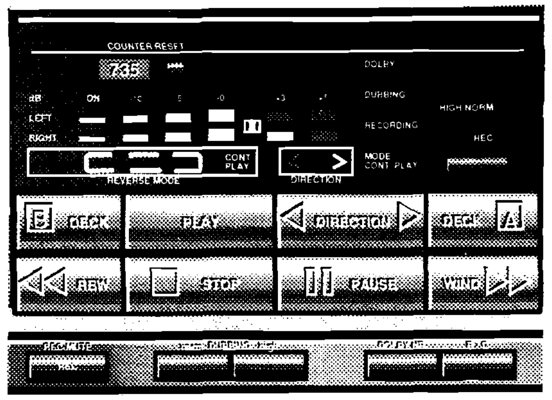

COUNTER RESET
735
DOLBY
DUBBING
RECORDING
HIGH NORM
REC
CONT PLAY
REVERSE MODE
DIRECTION
MODE CONT PLAY
DECK
PLAY
DIRECTION
DECK
REW
STOP
PAUSE
WIND

Fig. 2

(I) PROGRAMMA DIAGNOSTICO DI SERVIZIO

Il microprocessore nella parte del comando digitale contiene un porgramma diagnostico che si divide nei seguenti capitoli:

1. test del display
2. test della tastiera
3. codice ROM
4. test del RAM

Oss.: Il RAM test si esegue per ultimo, perché dal RAM test non si può più richiamare nessun altro test.

L'accensione del programma diagnostico:

L'apparecchio si predispone per il modo diagnostico premendo e tenendo premuti simultaneamente i tasti "DECK A" e "DECK B" accendendo quindi l'interruttore di alimentazione.
Finché i tasti "DECK A" e "DECK B" sono tenuti premuti ci si trova nel modo diagnostico "Display test" (vedasi capitolo1). Una volta lasciati ambedue i tasti si passa al programma diagnostico di base,
I seguenti LED lampeggeranno: DECK B, >, ON, ⇋.

Attenzione: Il programma diagnostico non si avvia quando il microprocessore è guasto, o quando non sono rispettate alcune condizioni di base.
Quando si sospetta che ci sia un difetto nella parte del comando è il caso di controllare prima la tensione dell'alimentazione, i tasti funzionali DECK A e DECK B, il segnale dell'orologio e l'impulso di "resettaggio".

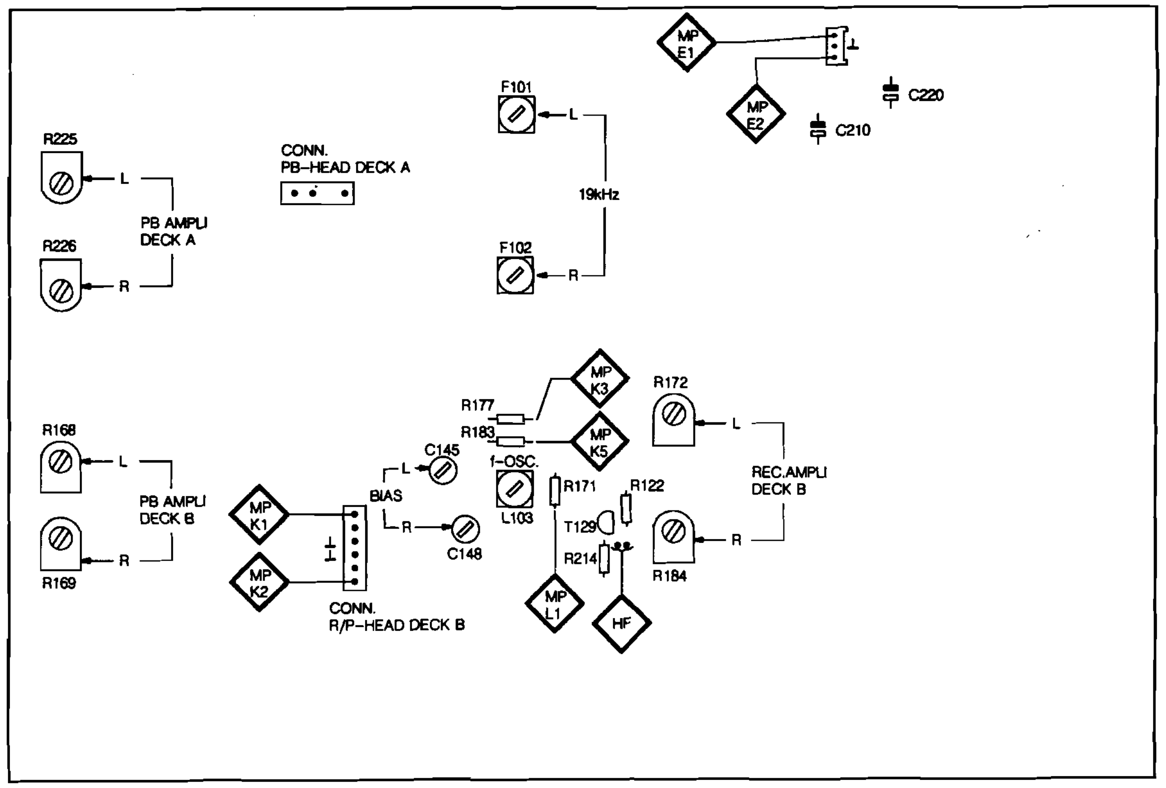
Spengimento del programma diagnostico

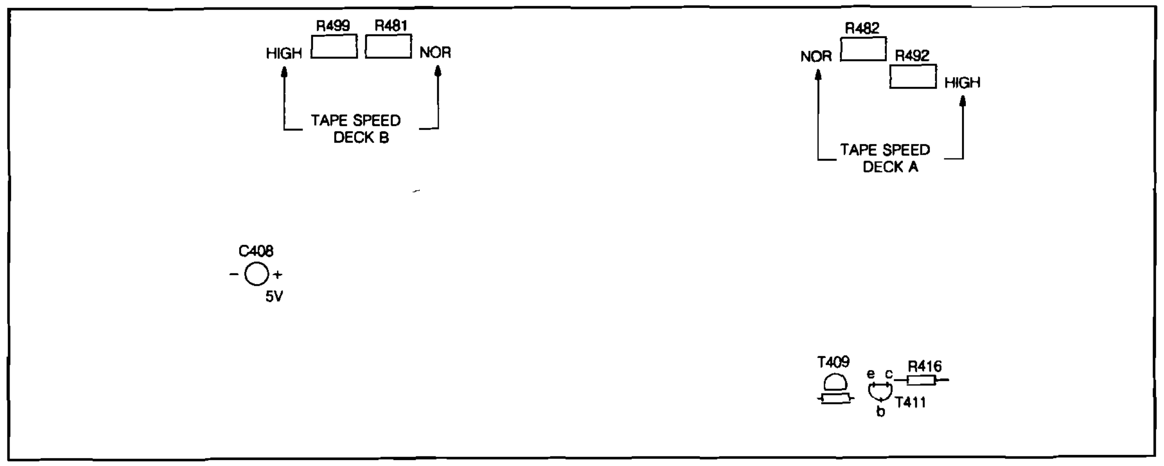
Si esce dal programma diagnostico semplicemente accendendo e spegnendo l'apparecchio o collegando il bottone 24 (bottone di "resettagio") brevemente alla massa.

1. **Display test**
   Il programma diagnostico del display può essere chiamato premendo dal programma diagnostico di base simultaneamente i tasti "DECK A" e "DECK B". Lampeggeranno i seguenti LED:

   LED: DECK A
   REC
   CD SYNCHRO
   ⊏⊐
   DIR <
   HIGH
2. **Key test**
   Quando si preme un tasto di funzione nel display lampeggerà un LED o combinazione di LED (vedasi tabella 1).
3. **Codice ROM**
   Premendo simultaneamente i tasti "Dubbing NORMAL" e "DECK A" si rende visibile il codice ROM.
   E'indicato da una combinazione di LED (vedasi tabella 2).
4. **RAM test**
   Il RAM test si chiama premendo simultaneamente i tasti "DIRECTION" e "STOP".
   Nel caso che il RAM test si sia svolto in senso positivo lampeggeranno i LED "DECK A" e "DECK B". Qualora si riscontrasse un difetto in una cellula RAM l'apparecchio passerà dal programma diagnostico al modo normale.

   Oss.: Il RAM test si esegue per ultimo, perché dal RAM test non si può più richiamare nessun altro test. Per uscire dal programma diagnostico basta accendere o spegnere l'apparecchio o collegare brevemente il bottone 24 (bottone di "resettaggio" alla massa.


MP E1
MP E2
C220
C210
F101
L
19kHz
F102
R
R225
L
R226
R
PB AMPLI DECK A
CONN. PB-HEAD DECK A
R177
R183
MP K3
MP K5
C145
f-OSC.
BIAS
L103
R171
R122
T129
R214
MP L1
HF
R172
L
REC.AMPLI DECK B
R184
R
R168
L
R169
R
PB AMPLI DECK B
MP K1
MP K2
C148
CONN. R/P-HEAD DECK B


R499
R481
HIGH
NOR
TAPE SPEED DECK B
R482
NOR
R492
HIGH
TAPE SPEED DECK A
C408
5V
T409
e
c
b
R416
T411

MDA.02382
T06-943

ELECTRICAL MEASUREMENTS AND ADJUSTMENTS

General conditions

The following general conditions apply to the electrical measurments and adjustments, unless explicity stated otherwise.

- Voltage 220V ± 5%, 50 Hz
- Ambient temperature 20 to 25°C.
- Dolby NR in position off.
- Tape speed in position normal speed.
- Recording level control at maximum.
- The voltages have been measured relative to earth.
- The measurements and adjustments are related to the left-hand channel. The corresponding test points and adjusting elements for the right-hand channel are given in brackets.

Required test equipment and test cassettes

- LF generator
- AC millivoltmeter (mV-meter)
- Frequency counter
- Universal test cassette SBC419Cr-4822 397 30069 (250 nWb/m)

Adjustment	Cassette	Recorder in position	Apply signal to	Measure on	Read on	Adjust with	Value
Tape speed *b High speed	2x SBC419 3150 Hz	Interconnect basis and emitter of transistor T411					
		Play deck A and B at the same time	–	MP-E1	Freq.	R492 (A-deck)	6300 Hz -0.5% ± 0.1%
				(MP-E2)	counter	R499 (B-deck)	6300 Hz -0.2% ± 0.1%
		Remove the interconnection					
Normal speed *b	SBC419	Play	–	MP-E1	Freq.	R482 (A-deck)	3150 Hz -0.5% ± 0.1%
	3150 Hz	(deck A or B)		(MP-E2)	counter	R481 (B-deck)	3150 Hz -0.2% ± 0.1%
Head azimuth	SBC419 10 kHz	Play (deck A or B)	–	MP-E1 (MP-E2)	mV-meter	Head azimuth adjust screw *c	Max. output
Playback sensitivity	SBC419 315 Hz-0 dB	Play (deck A or B)	–	MP-E1 (MP-E2)	mV-meter	R225 (R226) A-deck	980 mV
						R168 (R169) B-deck	980 mV
Playback frequency response	SBC419 40Hz; to 18 KHz	Play (deck A or B)	–	MP-E1 (MP-E2)	mV-meter	–	See graph Fig. 4 frequency response
Target value BIAS	Chromium cassette	Deck B REC	–	MP-K1 (MP-K2)	mV-meter	C145 (C148)	18 V (Probe 10:1/10MΩ-8pf)
Recording sensitivity	SBC419 side 2 *d	Deck B REC+PLAY	315 Hz, to line input	MP-E1 (MP-E2)	mV-meter	LF-generator	390 mV
				Disable the bias by interconnecting b of T126 to earth (point HF)			
				MP-K3 (MP-K5)	mV-meter	R172 (R184)	3 mV = target value
				Remove the interconnection. Make a recording and play it back			
		Play	–	MP-E1 (MP-E2)	mV-meter		390 mV *e
BIAS	SBC419 side 2 *d	Deck B REC+PLAY	–	MP-K1 (MP-K2)	mV meter	C145 (C148)	18 V=target value (Probe 10:1/10MΩ-8pf)
			315 Hz, to line input	MP-E1 (MP-E2)	mV-meter	LF generator	39 mV
			40 Hz-6.3 kHz 10 kHz-12 kHz 14 kHz-15 kHz 16 kHz, to line input	Record a number of frequencies with the same input voltage and play them back			
		Play	–	MP-E1 (MP-E2)	mV-meter	–	See graph Fig. 5 if necessary repeat BIAS adjustment *f
f-osc	Arbitrary cassette	Deck B REC	–	MP-L1	Frequency counter	L103	83 kHz ± 5 kHz
19 kHz Suppression	Arbitrary cassette	Deck B REC Dolby on	315 Hz, to line input	MP-E1 (MP-E2)	mV-meter	LF-generator	980 mV
			19 kHz, to line input	MP-E1 (MP-E2)	mV-meter	F101 (F102)	< 49 mV

(GB) *Notes:*

*a. Prior to any measurement or adjustment with the tape running, heads and tape guides should be degaussed and cleaned.

*b. It is important that first the high speed is adjusted and hereafter the normal speed. The difference of speed between deck A and B may be 1% at the utmost, both for normal speed and high speed.

*c. Head azimuth
Direction of tape-threading to the right (FWD-PLAY) left-hand screw. Direction of tape-threading to the left (REV-PLAY) righthand screw. When the output levels of the right and left channel are different, set the channel with the lowest value to maximum. Use the same tape and tape section for the deck A and the deck B.
After adjusting, provide the azimuth set screws with sealing paint.

*d. If the accuracy requirements are less stringent a high quality chromium cassette may be used as an alternative.

*e. The output voltage on MP-E1 (MP-E2) should read 390 mV ± 0.25 dB.
If this is not the case reduce the LF-signal (bias disabled) by as many dB's as the reading was too low or too high by means of R172 (R184).

*f. When one channel is adjusted this may slightly affect the adjustment of the other channel.
If the adjustment is correct the frequency response curve will be similar to curve b in Fig. 6 distortion ≤ 2%.

(F) *Remarques:*

*a. Le chaque mesure ou réglage à la chaîne, les têtes et guide-bande doivent être démagnetisées et nettoyées.

*b. Il est important qu'avant tout la grande vitesse soit réglée; procéder ensuite au réglage de la vitesse normale. La différence de vitesse entre le mécanisme A et la B ne doit pas dépasser 1%, tant pour la grande vitesse que pour la vitesse normale.

*c. Procéder au réglage de l'azimuth.
Direction du défilement vers la droite (FWD-PLAY), vis de gauche, défilement vers la gauche (REV-PLAY) vis de droite. S'il y a différence entre le niveau de sortie de la voie de gauche et de celle de droite, régler la voie ayant la valeur la plus basse au maximum.
Utilises la même bande et section de bande pour platine A que pour la B.
Après réglage de l'azimuth, bloquer la vis à la laque.

*d. Si les exigences poinat vue precision ne sont pas tellement élevées, une cassette au chrome de bonne qualité pourra aussi convenir.

*e. La tension de sortie sur MP-E1 (MP-E2) doit affiche 390 mV ± 0.25 dB.
Si ce n'étaicas, régler avec R172 (R184) le signal AF (prémagnétisation exclue) d'autant de dB en-dessous ou au-dessous du résultat de l'affichage qui serait trop haut ou trop bas.

*f. Lors du réglage d'un des canaux on pourrait constater qu'il y a incidence sur l'autre.
Si le réglage est comme il faut, la courbe de fréquence aura la forme de la Fig. 6 courbe b, distorsion ≤ 2%.

(NL) *Opmerkingen:*

*a. Voor alle metingen en instellingen met lopende band dienen de koppen en bandgeleiders gedemagnetiseerd en gereinigd te worden.

*b. Het is belangrijk dat eerst de hoge snelheid wordt ingesteld en daarna de normale snelheid. Het verschil in snelheid tussen deck A en B mag zowel voor de normale snelheid als voor de hoge snelheid ten hoogste 1% zijn.

*c. Kop-azimuth
Bandlooprichting naar rechts (FWD-PLAY) linkerschroef. Bandlooprichting naar links (REV-PLAY) rechterschroef.
Wanneer het uitgangsniveau tussen het rechter- en linkerkanaal verschilt, dan moet men het kanaal met de laagste waarde op maximum instellen.
Voor deck A en deck B dezelfde band en bandgedeelte gebruiken. Na het instellen de azimuth instelschroeven van een borglak voorzien.

*d. Bij minder hoge nauwkeurigheid kan ook een chromiumcassette van goede kwaliteit gebruikt worden.

*e. Indien de uitgangsspanning op MP-E1 (MP-E2) geen 390 mV ± 0.25 dB is regel dan met R172 (R184) het LF signaal (voormagnetisatie uitgeschakeld) zoveel dB lager of hoger als de meteruitslag te hoog of te laag is.

*f. Bij het instellen van het ene kanaal kan het andere iets worden beïnvloed.
Bij een goede instelling zal de frequentiekarakteristiek als in Fig. 6 curve b, verlopen, vervorming ≤ 2%.

(D) *Anmerkungen:*

*a. Vor jeder Messung oder Einstellung mit laufendem Band empfielt es sich, die Köpfe und Bandführungen zu entmagnetisieren und zu reinigen.

*b. Es ist wichtig, dass zuerst die hohe Geschwindigkeit und dann die normale Geschwindigkeit eingestellt wird. Der Unterschied in Geschwindigkeit zwischen Deck A und Deck B darf sowohl für die normale Geschwindigkeit wie die hohe Geschwindigkeit höchstens 1% sein.

*c. Kopfazimut.
Bandlaufrichtung nach rechts (FWD-PLAY)-linke Schraube. Bandlaufrichtung nach links (REV-PLAY)-rechte Schraube.
Wenn der Ausgangspegel zwischen dem rechten und linken Kanal verschieden ist, so ist der Kanal mit dem niedrigsten Wert auf Maximum einzustellen.
Für Deck A und Deck B das gleiche Band und den gleichen Bandteil benutzen. Nach dem Einstellen die Azimut Einstellschrauben lacksichern.

*d. Für weniger höher Genauigkeit lässt sich auch eine Chromium-Cassette guter Qualität verwenden.

*e. Die Ausgangsspannung an MP-E1 (MP-E2) muss 390 mV ± 0.25 dB sein. Ist dass nicht der Fall, dann mit R172 (R184) das NF-Signal (Vormagnetisierung ausgeschlossen) um soviel dB niedriger oder höher einstellen als die Messwert zu hoch oder zu niedrig war.

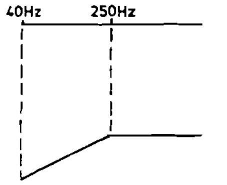
*f. Beim Einstellen des einen Kanals kann der andere etwas beeinflusst werden.
Bei richtiger Einstellung verläuft der Frequenzgang wie in Abb. 6 Kurve b, Verzerrung ≤ 2%.

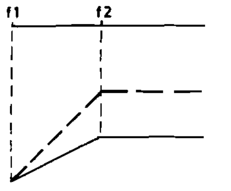
(I) *Note:*

*a. Prima di effet
cassetta inse
essere smagr

*b. Bisogna anzit
fare la regola
La differenza
del meccanis
deve superar
la velocità no

*c. Procedere all
Senso die tra
(FWD-PLAY),
trasportato v
destra.
Se il livello de
del canale de
massimo.





Metal	4
Cr	4
Normal	4

nts are related to the
ding test points and
and channel are given in

assettes

-4822 397 30069

	Value
)	6300 Hz -0.5% ± 0.1%
)	6300 Hz -0.2% ± 0.1%
)	3150 Hz -0.5% ± 0.1%
)	3150 Hz -0.2% ± 0.1%
c	Max. output
	980 mV
	980 mV
	See graph Fig. 4 frequency response
	18 V (Probe 10:1/10MΩ-8pf)
	390 mV
126 to earth (point HF)	
	3 mV = target value
rding and play it back	
	390 mV *e
	18 V=target value (Probe 10:1/10MΩ-8pf)
	39 mV
	See graph Fig. 5 if necessary repeat BIAS adjustment *f
	83 kHz ± 5 kHz
	980 mV
	< 49 mV

(GB) *Notes:*

*a. Prior to any measurement or adjustment with the tape running, heads and tape guides should be degaussed and cleaned.

*b. It is important that first the high speed is adjusted and hereafter the normal speed. The difference of speed between deck A and B may be 1% at the utmost, both for normal speed and high speed.

*c. Head azimuth
Direction of tape-threading to the right (FWD-PLAY) left-hand screw. Direction of tape-threading to the left (REV-PLAY) righthand screw. When the output levels of the right and left channel are different, set the channel with the lowest value to maximum. Use the same tape and tape section for the deck A and the deck B.
After adjusting, provide the azimuth set screws with sealing paint.

*d. If the accuracy requirements are less stringent a high quality chromium cassette may be used as an alternative.

*e. The output voltage on MP-E1 (MP-E2) should read 390 mV ± 0.25 dB.
If this is not the case reduce the LF-signal (bias disabled) by as many dB's as the reading was too low or too high by means of R172 (R184).

*f. When one channel is adjusted this may slightly affect the adjustment of the other channel.
If the adjustment is correct the frequency response curve will be similar to curve b in Fig. 6 distortion ⩽ 2%.

(F) *Remarques:*

*a. Le chaque mesure ou réglage à la chaîne, les têtes et guide-bande doivent être démagnetisées et nettoyées.

*b. Il est important qu'avant tout la grande vitesse soit réglée; procéder ensuite au réglage de la vitesse normale. La différence de vitesse entre le mécanisme A et la B ne doit pas dépasser 1%, tant pour la grande vitesse que pour la vitesse normale.

*c. Procéder au réglage de l'azimuth.
Direction du défilement vers la droite (FWD-PLAY), vis de gauche, défilement vers la gauche (REV-PLAY) vis de droite. S'il y a différence entre le niveau de sortie de la voie de gauche et de celle de droite, régler la voie ayant la valeur la plus basse au maximum.
Utilises la même bande et section de bande pour platine A que pour la B.
Après réglage de l'azimuth, bloquer la vis à la laque.

*d. Si les exigences poinat vue precision ne sont pas tellement élevées, une cassette au chrome de bonne qualité pourra aussi convenir.

*e. La tension de sortie sur MP-E1 (MP-E2) doit affiche 390 mV ± 0.25 dB.
Si ce n'étaicas, régler avec R172 (R184) le signal AF (prémagnétisation exclue) d'autant de dB en-dessous ou au-dessous du résultat de l'affichage qui serait trop haut ou trop bas.

*f. Lors du réglage d'un des canaux on pourrait constater qu'il y a incidence sur l'autre.
Si le réglage est comme il faut, la courbe de fréquence aura la forme de la Fig. 6 courbe b, distorsion ⩽ 2%.

(NL) *Opmerkingen:*

*a. Voor alle metingen en instellingen met lopende band dienen de koppen en bandgeleiders gedemagnetiseerd en gereinigd te worden.

*b. Het is belangrijk dat eerst de hoge snelheid wordt ingesteld en daarna de normale snelheid. Het verschil in snelheid tussen deck A en B mag zowel voor de normale snelheid als voor de hoge snelheid ten hoogste 1% zijn.

*c. Kop-azimuth
Bandlooprichting naar rechts (FWD-PLAY) linkerschroef. Bandlooprichting naar links (REV-PLAY) rechterschroef.
Wanneer het uitgangsniveau tussen het rechter- en linkerkanaal verschilt, dan moet men het kanaal met de laagste waarde op maximum instellen.
Voor deck A en deck B dezelfde band en bandgedeelte gebruiken. Na het instellen de azimuth instelschroeven van een borglak voorzien.

*d. Bij minder hoge nauwkeurigheid kan ook een chromiumcassette van goede kwaliteit gebruikt worden.

*e. Indien de uitgangsspanning op MP-E1 (MP-E2) geen 390 mV ± 0.25 dB is regel dan met R172 (R184) het LF signaal (voormagnetisatie uitgeschakeld) zoveel dB lager of hoger als de meteruitslag te hoog of te laag is.

*f. Bij het instellen van het ene kanaal kan het andere iets worden beïnvloed.
Bij een goede instelling zal de frequentiekarakteristiek als in Fig. 6 curve b, verlopen, vervorming ⩽ 2%.

(D) *Anmerkungen:*

*a. Vor jeder Messung oder Einstellung mit laufendem Band empfielt es sich, die Köpfe und Bandführungen zu entmagnetisieren und zu reinigen.

*b. Es ist wichtig, dass zuerst die hohe Geschwindigkeit und dann die normale Geschwindigkeit eingestellt wird. Der Unterschied in Geschwindigkeit zwischen Deck A und Deck B darf sowohl für die normale Geschwindigkeit wie die hohe Geschwindigkeit höchstens 1% sein.

*c. Kopfazimut.
Bandlaufrichtung nach rechts (FWD-PLAY)-linke Schraube. Bandlaufrichtung nach links (REV-PLAY)-rechte Schraube.
Wenn der Ausgangspegel zwischen dem rechten und linken Kanal verschieden ist, so ist der Kanal mit dem niedrigsten Wert auf Maximum einzustellen.
Für Deck A und Deck B das gleiche Band und den gleichen Bandteil benutzen. Nach dem Einstellen die Azimut Einstellschrauben lacksichern.

*d. Für weniger höher Genauigkeit lässt sich auch eine Chromium-Cassette guter Qualität verwenden.

*e. Die Ausgangsspannung an MP-E1 (MP-E2) muss 390 mV ± 0.25 dB sein. Ist dass nicht der Fall, dann mit R172 (R184) das NF-Signal (Vormagnetisierung ausgeschlossen) um soviel dB niedriger oder höher einstellen als die Messwert zu hoch oder zu niedrig war.

*f. Beim Einstellen des einen Kanals kann der andere etwas beeinflusst werden.
Bei richtiger Einstellung verläuft der Frequenzgang wie in Abb. 6 Kurve b, Verzerrung ⩽ 2%.

(I) *Note:*

*a. Prima di effetuare della misure o regolazioni con la cassetta inserita, le testine e le guide nastro devono essere smagnetizzate e pulite.

*b. Bisogna anzitutto regolare la grande velocità poi, fare la regolazione della velocità normale.
La differenza di velocità del mecanismo A e quella del meccanismo A e quella del meccanismo B non deve superare 1%, sia per la grande velocità che par la velocità normale.

*c. Procedere alla regolazione dell'azimuth.
Senso die trasporto del nastro verso la destra (FWD-PLAY), vite di sinistra et quando il nastro viene trasportato verso la sinistra (REV-PLAY), la vite di destra.
Se il livello del canale sinistro è diverso da quelllo del canale destro, tarare il canale più basso per il massimo.
Assicurarsi che la stessa sezione del nastro viene usata per la piastra A che per la piastra B.
Dopo la taratura, bloccare le viti con lacca.

*d. Si il controllo non deve essere molto accurato, si può utilizarre une cassette al cromo di alta qualita.

*e. Gli la tensione d'uscita su di MP-E1/MP-E2 devono essere su 390 mV ± 0.25 dB.
Se ciò non è aumentare o ridurre il segnale AF (bias disinserito), in funzione della indicazione, in dB, troppo bassa o troppo alta, per mezzo di R172 (R184).

*f. Quando viene regolato un canale, questo può influire sulla regolaizone dell'altro.
Se la regolazione è correcta la curva della riposta in frequenza sarà simile alla curva b della Fig. 6.
Distorsione aumenterà ⩽ 2%.

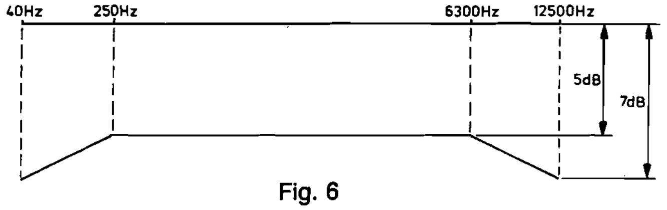


Fig. 6

13282A2

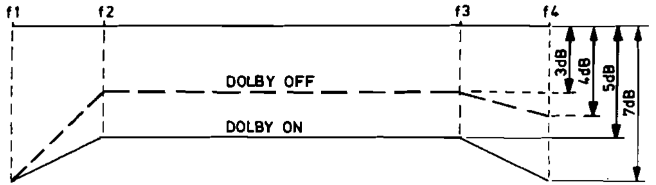


Fig. 7

29 612A12

	f1	f2	f3	f4
Metal	40 Hz	125 Hz	8 kHz	14 kHz
Cr	40 Hz	125 Hz	8 kHz	14 kHz
Normal	40 Hz	125 Hz	8 kHz	13 kHz

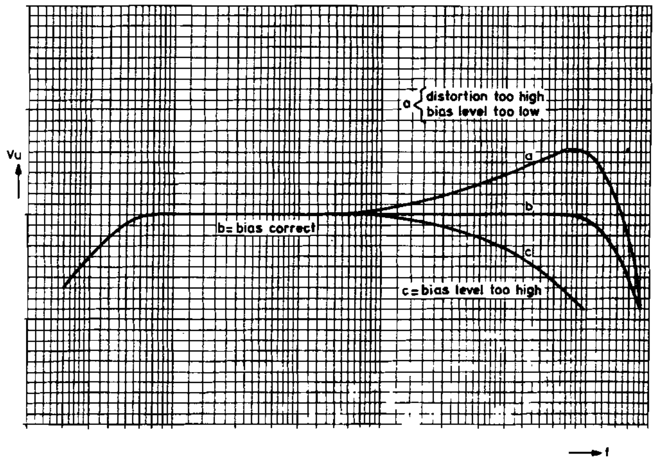
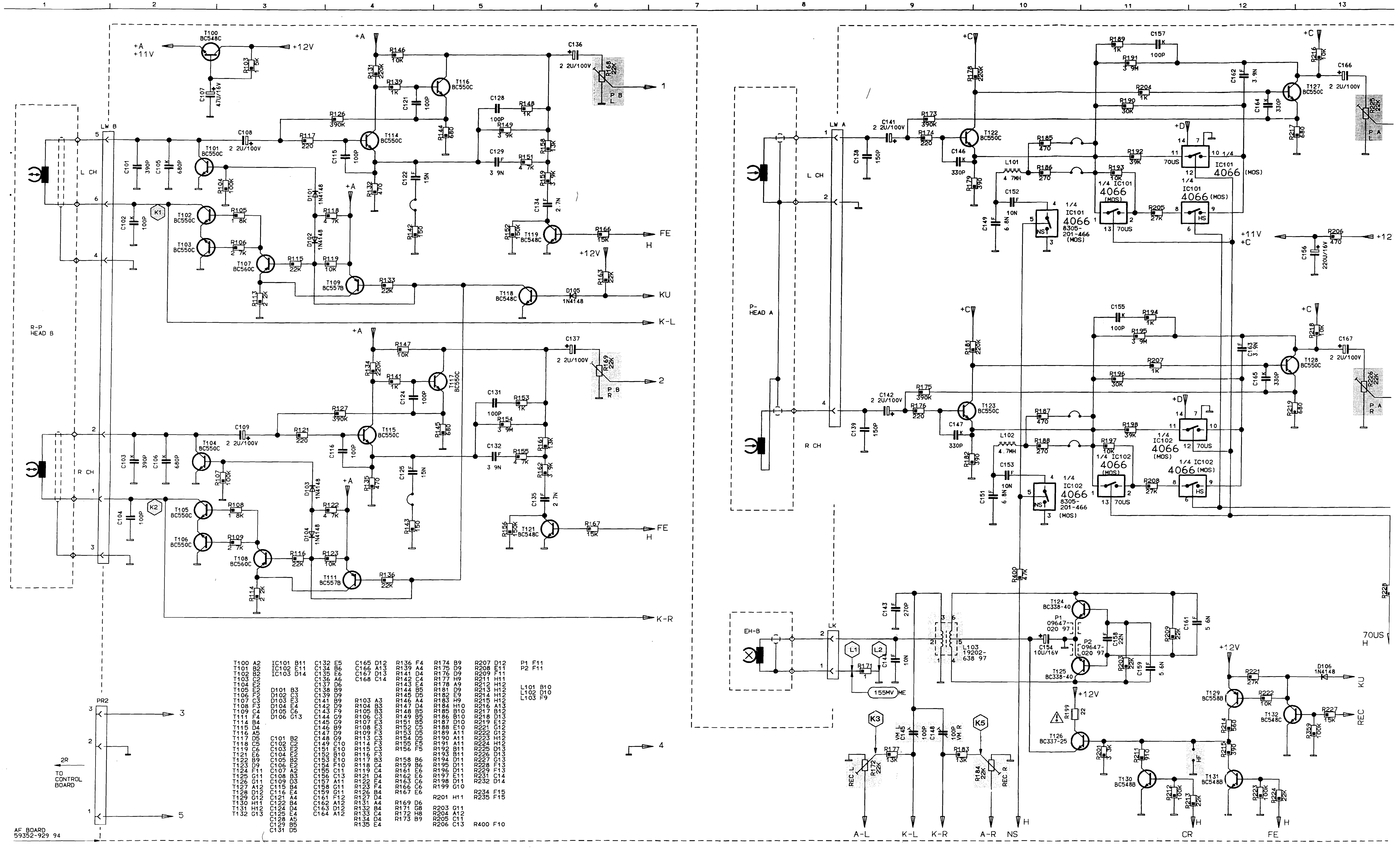


Fig. 8

29 476 A12

AF PANEL (DIAGRAM 1)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+A +11V
T100 BC548C
+12V
R103 1.5K
C107 47U/16V
+A
R146 10K
R131 220K
R139 1K
T116 BC550C
C121 100P
C136 2.2U/100V
R168 22K
P B L
1
R126 390K
R144 680
C128 100P
R148 1K
R149 3.9K
LW B
C101 390P
C105 680P
C108 2.2U/100V
R117 220
T114 BC550C
C115 100P
R158 3K
T101 BC550C
C129 3.9N
R151 4.7K
R104 100K
D101 1N4148
C122 15N
R132 470
R159 3.9K
L CH
K1
C102 100P
T102 BC550C
R105 1.8K
R118 4.7K
C134 2.7N
R142 150
R152 50K
T119 BC548C
R166 15K
FE
H
T103 BC550C
R106 2.7K
D102 1N4148
T107 BC560C
R115 22K
R119 10K
+12V
R163 22K
T109 BC557B
R133 22K
R113 2.2K
T118 BC548C
D105 1N4148
KU
K-L
R-P HEAD B
+A
R147 10K
R134 220K
R141 1K
T117 BC550C
C124 100P
C137 2.2U/100V
R169 22K
P B R
2
R127 390K
R145 680
C131 100P
R153 1K
R154 3.9M
C103 390P
C106 680P
C109 2.2U/100V
R121 220
T115 BC550C
C116 100P
R161 3K
T104 BC550C
C132 3.9N
R155 4.7K
R107 100K
D103 1N4148
C125 15N
R135 470
R162 3.9K
R CH
K2
C104 100P
T105 BC550C
R108 1.8K
R122 4.7K
C135 2.7N
R143 150
R156 50K
T121 BC548C
R167 15K
FE
H
T106 BC550C
R109 2.7K
D104 1N4148
T108 BC560C
R116 22K
R123 10K
T111 BC557B
R136 22K
R114 2.2K
K-R
PR2
3
2
1
2R
TO CONTROL BOARD
AF BOARD 59352-929 94
+C
R178 220K
R189 1K
C157 100P
R191 3.9M
C162 3.9N
+C
R216 10K
C166 2.2U/100V
T127 BC550C
R204 1K
R190 30K
C164 330P
R225 22K
P A L
LW A
C141 2.2U/100V
R173 390K
R174 220
T122 BC550C
R217 680
C138 150P
R185 470
+D
R192 39K
IC101 4066 (MOS)
70US
C146 330P
L101 4.7MH
R186 270
R193 10K
1/4 IC101 4066 (MOS)
R179 390
C152 10N
1/4 IC101 4066 8305-201-466 (MOS)
NS
R205 27K
HS
C149 6.8N
70US
+11V +C
R206 470
+12
C156 220U/16V
P-HEAD A
R CH
+C
R181 220K
C155 100P
R194 1K
R195 3.9M
+C
R218 10K
C163 3.9N
C167 2.2U/100V
T128 BC550C
R207 1K
R196 30K
C165 330P
R226 22K
P A R
R219 680
C142 2.2U/100V
R175 390K
R176 220
T123 BC550C
C139 150P
C147 330P
R187 470
R198 39K
1/4 IC102 4066 (MOS)
L102 4.7MH
R188 270
R197 10K
1/4 IC102 4066 (MOS)
R182 390
C153 10N
1/4 IC102 4066 8305-201-466 (MOS)
R208 27K
C151 6.8N
R400 47K
R228
70US H
EH-B
LK
C143 270P
L1
L2
R171 1
C144 10N
155MV ME
L103 19202-638 97
T124 BC338-40
P1 09647-020 97
C154 10U/16V
P2 09647-020 97
C158 22N
R209 22K
C161 5.6N
R203 22K
C159 5.6N
T125 BC338-40
+12V
R199 22
T126 BC337-25
+12V
D106 1N4148
KU
R221 27K
T129 BC558B
R222 10K
T132 BC548C
R227 15K
REC
K3
K5
C145 VM L
C148 100P
100P VM R
R177 13K
R183 13K
REC L
R172 22K
R184 22K
REC R
R201 3.3K
R211 910
HF
R214 560
R215 390
R359 100K
T130 BC548B
T131 BC548B
R212 100K
R213 22K
R223 10K
R224 22K
A-L K-L K-R A-R NS H
CR H
FE H

T100	A2
T101	B2
T102	B2
T103	C2
T104	E2
T105	E2
T106	F2
T107	C3
T108	F3
T109	C4
T111	F4
T114	B4
T115	D4
T116	A5
T117	D5
T118	C5
T119	C6
T121	E6
T122	B9
T123	D9
T124	F11
T125	G11
T126	G11
T127	A12
T128	D12
T129	G12
T130	H11
T131	H12
T132	G13
IC101	B11
IC102	E11
IC103	D14
D101	B3
D102	C3
D103	E3
D104	E4
D105	C6
D106	G13
C101	B2
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C116	E4
C121	A4
C122	B4
C124	D4
C125	E4
C128	A5
C129	B5
C131	D5
C132	E5
C134	B6
C135	E6
C136	A6
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C139	D9
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C142	D9
C143	F9
C144	G9
C145	G9
C146	B9
C147	D9
C148	G9
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C151	E10
C152	B10
C153	E10
C154	F10
C155	C11
C156	C13
C157	A11
C158	G11
C159	G11
C161	F12
C162	A12
C163	D12
C164	A12
C165	D12
C166	A13
C167	D13
C168	C14
R103	A3
R104	B3
R105	B3
R106	C3
R107	E3
R108	E3
R109	F3
R113	C3
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R173	B9
R174	B9
R175	D9
R176	D9
R177	H9
R178	A9
R181	D9
R182	E9
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R184	H10
R185	B10
R186	B10
R187	D10
R188	E10
R189	A11
R190	A11
R191	A11
R192	B11
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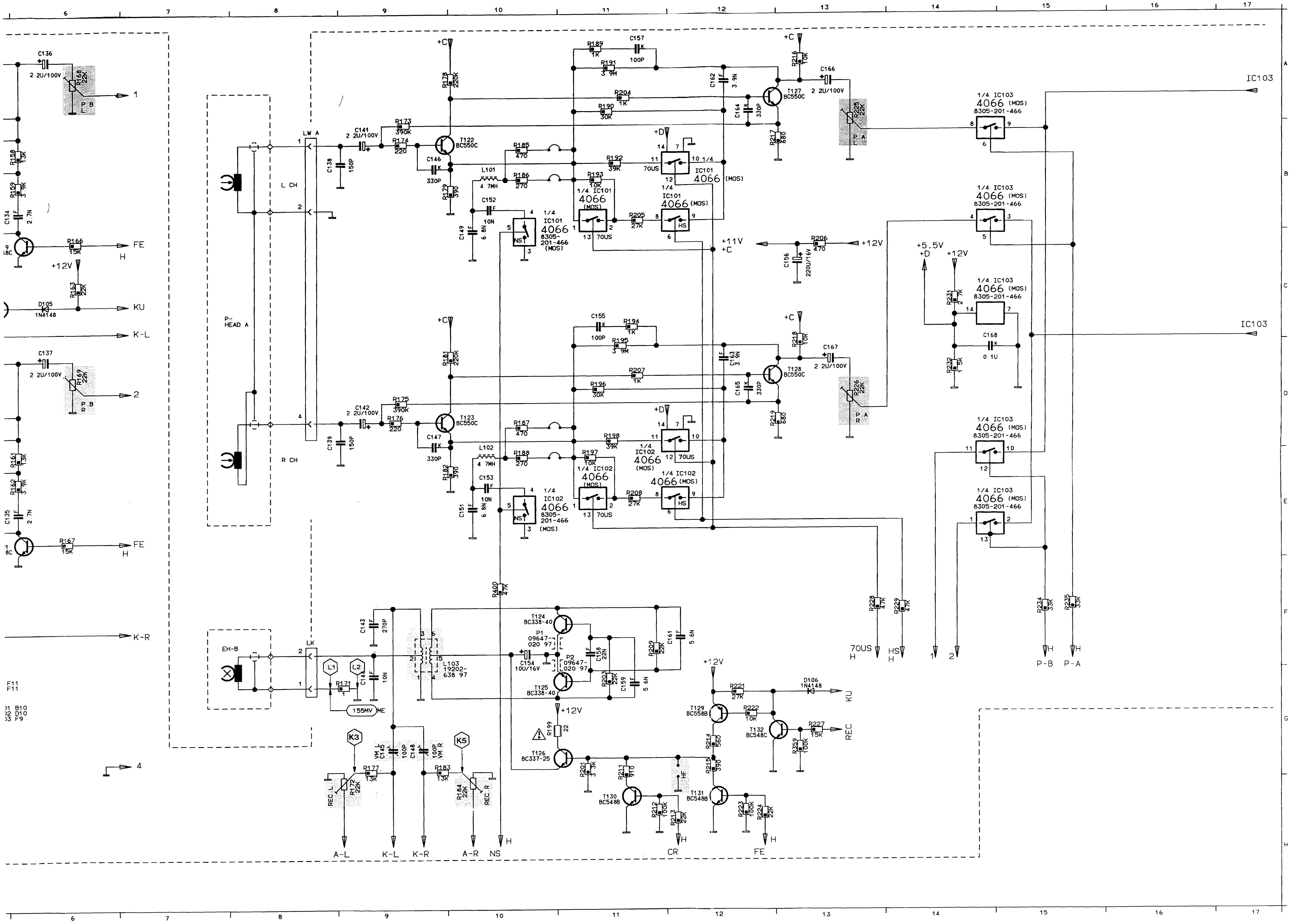
R219	E12
R221	G12
R222	G12
R223	H12
R224	H12
R225	D13
R226	D13
R227	G13
R228	F13
R229	F13
R231	C14
R232	D14
R234	F15
R235	F15
R400	F10
P1	F11
P2	F11
L101	B10
L102	D10
L103	F9



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R CH
LW A
EH-B
LK
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T123 BC550C
T127 BC550C
T128 BC550C
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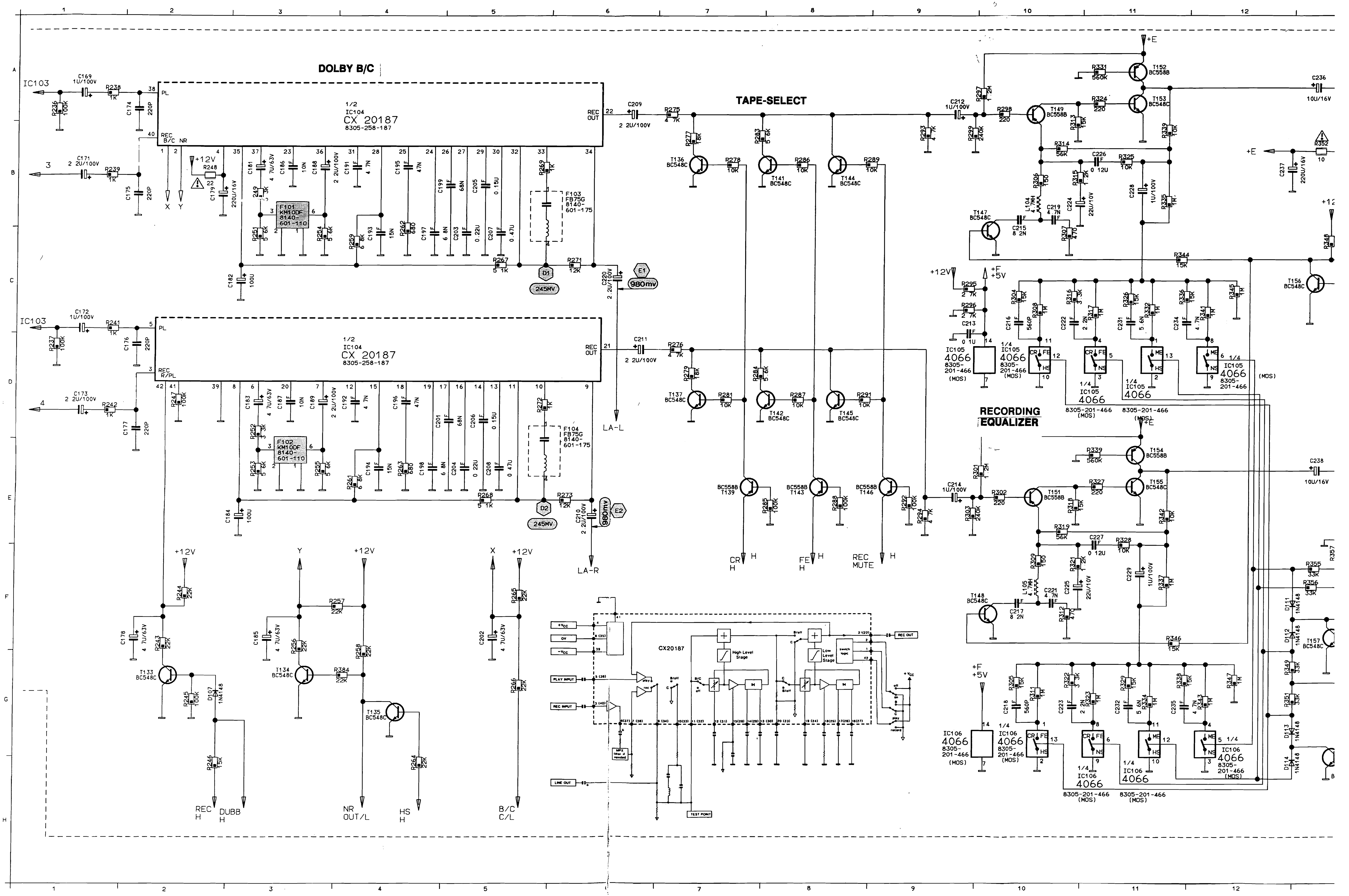
T125 BC338-40
T126 BC337-25
T129 BC558B
T130 BC548B
T131 BC548B
T132 BC548C
1/4 IC101 4066 (MOS) 8305-201-466
1/4 IC102 4066 (MOS) 8305-201-466
1/4 IC103 4066 (MOS) 8305-201-466
IC103
L101 4 7MH
L102 4 7MH
L103 19202-638 97
P1 09647-020 97
P2 09647-020 97
D105 1N4148
D106 1N4148
+C
+D
+11V
+12V
+5.5V
70US
HS
NS
155MV
K3
K5
L1
L2
REC L
REC R
P.B L
P.B R
P A L
P A R
VM L
VM R
HF
FE
KU
K-L
K-R
REC
A-L
A-R
CR
P-B
P-A
H
1
2
4

PHIL-04081/ DRUCK 8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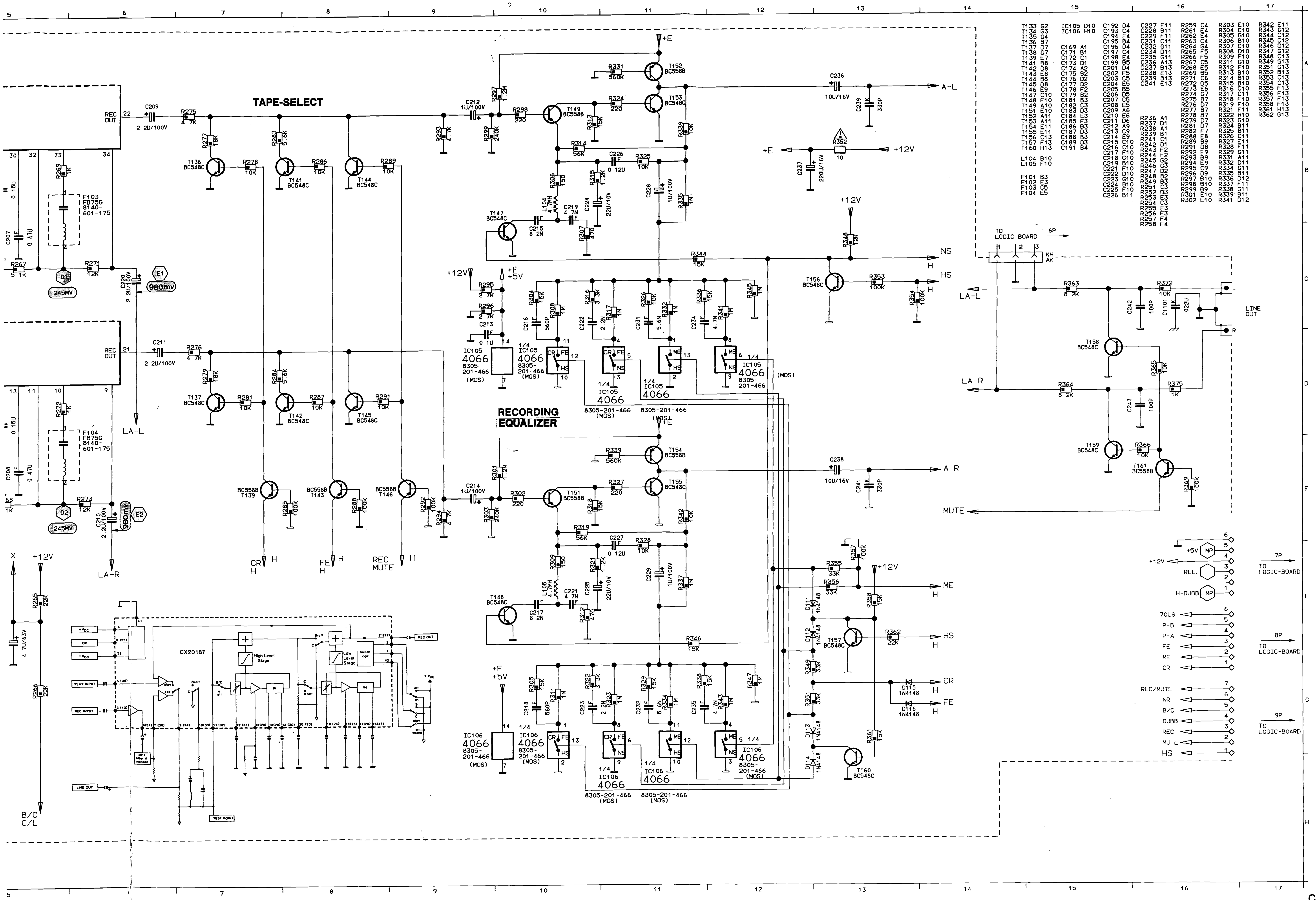
PL
REC B/C NR
REC OUT
REC R/PL
F101 KM10DF 8140-601-110
F102 KM10DF 8140-601-110
F103 FB75G 8140-601-175
F104 FB75G 8140-601-175
D1 245MV
D2 245MV
E1 980mv
E2 980mv
LA-L
LA-R
CR H
FE H
REC MUTE H
REC H
DUBB H
NR OUT/L
HS H
B/C C/L
+12V
+E
+F +5V
X
Y
3
4
IC105 4066 8305-201-466 (MOS)
IC106 4066 8305-201-466 (MOS)
T133 BC548C
T134 BC548C
T135 BC548C
T136 BC548C
T137 BC548C
T139 BC558B
T141 BC548C
T142 BC548C
T143 BC558B
T144 BC548C
T145 BC548C
T146 BC558B
T147 BC548C
T148 BC548C
T149 BC558B
T151 BC558B
T152 BC558B
T153 BC548C
T154 BC558B
T155 BC548C
T156 BC548C
T157 BC548C
D107 1N4148
D111 1N4148
D112 1N4148
D113 1N4148
D114 1N4148
L104 4.7MH
L105 4.7MH
CX20187
+Vcc
0V
-Vcc
PLAY INPUT
REC INPUT
LINE OUT
REC OUT
TEST POINT
High Level Stage
Low Level Stage
switch logic
C209 2 2U/100V
C211 2 2U/100V
C212 1U/100V
C214 1U/100V
C236 10U/16V
C238 10U/16V
C237 220U/16V
R352 10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RECORDING EQUALIZER
REC OUT
A-L
A-R
LA-L
LA-R
NS
HS
ME
CR
FE
MUTE
REC MUTE
+E
+F +5V
+12V
T152 BC558B
T153 BC548C
T149 BC558B
T136 BC548C
T141 BC548C
T144 BC548C
T137 BC548C
T142 BC548C
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T139 BC558B
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T148 BC548C
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IC105 4066 8305-201-466 (MOS)
IC106 4066 8305-201-466 (MOS)
F103 FB75G 8140-601-175
F104 FB75G 8140-601-175
D111 1N4148
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D114 1N4148
D115 1N4148
D116 1N4148
D1 245MV
D2 245MV
E1 980mv
E2 980mv
CX20187
High Level Stage
Low Level Stage
PLAY INPUT
REC INPUT
LINE OUT
TEST POINT
TO LOGIC BOARD 6P
KH AK
LINE OUT
TO LOGIC-BOARD 7P
TO LOGIC-BOARD 8P
TO LOGIC-BOARD 9P
+5V MP
REEL
H-DUBB MP
70US
P-B
P-A
REC/MUTE
NR
B/C
DUBB
REC
MU L
B/C C/L
X

T133	G2
T134	G3
T135	G4
T136	B7
T137	D7
T138	G7
T139	E7
T141	B8
T142	D8
T143	E8
T144	B8
T145	D8
T146	E9
T147	C10
T148	F10
T149	A10
T151	E10
T152	A11
T153	A11
T154	E11
T155	E11
T156	C13
T157	F13
T160	H13
L104	B10
L105	F10
F101	B3
F102	E3
F103	C5
F104	E5
IC105	D10
IC106	H10
C169	A1
C171	B1
C172	C1
C173	D1
C174	A2
C175	B2
C176	D2
C177	D2
C178	F2
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C193	C4
C194	E4
C195	B4
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C211	D6
C212	A9
C213	C9
C214	E9
C215	C10
C216	C10
C217	F10
C218	G10
C219	B10
C221	F10
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C228	B11
C229	F11
C231	C11
C232	G11
C234	D11
C235	G11
C236	A13
C237	B13
C238	E13
C239	B13
C241	E13
R236	A1
R237	D1
R238	A1
R239	B1
R241	C1
R242	D1
R243	F2
R244	F2
R245	G2
R246	G3
R247	D2
R248	B2
R249	B3
R251	C3
R252	D3
R253	E3
R254	C3
R255	E3
R256	F3
R257	F4
R258	F4
R259	C4
R261	E4
R262	E4
R263	C4
R264	G4
R265	F5
R266	F5
R267	C5
R268	E5
R269	B5
R271	C6
R272	D5
R273	E6
R274	G7
R275	B7
R276	D7
R277	B7
R278	B7
R279	D7
R281	D7
R282	F7
R288	E8
R289	B9
R291	D8
R292	E9
R293	B9
R294	E9
R295	C9
R296	D9
R297	B10
R298	B10
R299	B9
R301	E10
R302	E10
R303	E10
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R332	D11
R334	G11
R335	B11
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R339	B11
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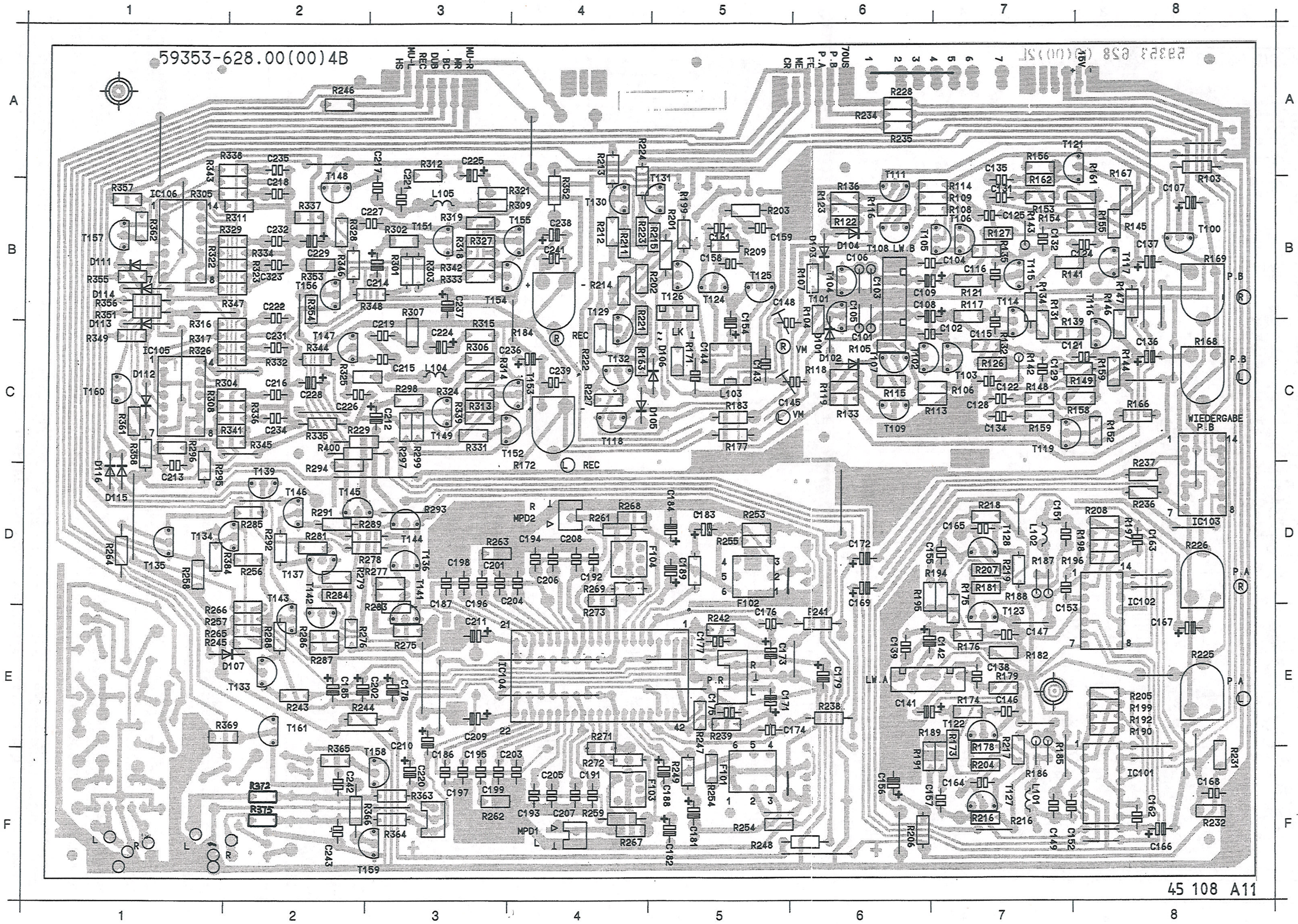
R343	G12
R344	C12
R345	C12
R346	G12
R347	G12
R348	C13
R349	G13
R351	G13
R352	B13
R353	C13
R354	C13
R355	F13
R356	F13
R357	F13
R358	F13
R361	H13
R362	G13

CS 26 107

AF PANEL



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C103	B6
C104	B7
C105	B6
C106	B6
C107	B8
C108	B6
C109	B6
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C116	B7
C121	C7
C122	C7
C124	B7
C125	B7
C129	C7
C131	B7
C132	B7
C134	C7
C135	A7
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C138	E7
C139	E6
C141	E6
C142	E7
C143	C5
C144	C5
C145	C5
C146	E7
C147	E7
C148	B5
C149	F7
C151	D7
C152	F7
C153	E7
C154	C5
C155	D6
C156	F6
C157	F6
C159	B5
C161	B5
C162	F8
C163	D8
C164	F7
C165	D7
C166	F8
C167	E8
C168	F8
C169	E6
C171	E5
C172	D6
C173	E5
C174	E5
C175	E5
C176	E5
C177	E5
C178	E3
C179	E6
C181	F5
C182	F5
C183	D5
C184	D5
C185	E2
C186	F3
C187	E3
C188	F5
C189	D5
C191	F4
C192	D4
C193	F3
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C201	D3
C202	E3
C203	F3
C204	E4
C205	F4
C206	D4
C207	F4
C208	D4
C209	E3
C210	F3
C211	E3
C212	C3
C213	D1
C214	B2
C215	C3
C216	C2
C217	A3
C218	B2
C219	C3
C220	F3
C221	B3
C222	B2
C224	C3
C225	A3
C226	C2
C227	B2
C228	C2
C229	B2
C231	C2
C232	B2
C234	C2
C235	A2
C236	C3
C237	B3
C238	B4
C239	C4
C241	B4
C242	F2
C243	F2
C259	F4
C323	B2
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D102	C6
D103	B6
D104	B6
D105	C4
D106	C5
D107	E1
D111	B1
D112	C1
D113	C1
D114	B1
D115	D1
D116	D1
D349	C1
F101	F5
F102	D5
F103	F4
F104	D4
L101	F7
L102	D7
L103	C5
L104	C3
L105	B3
R103	B8
R104	B6
R105	C6
R106	C7
R107	B5
R108	B7
R109	B7
R113	C6
R114	B7
R115	C6
R116	B6
R116	B7
R118	C6
R119	C6
R121	B7
R122	B6
R123	B6
R126	C7
R126	C7
R127	B7
R131	B7
R132	C7
R133	C6
R134	B7
R135	B7
R136	B6
R139	C7
R141	B7
R142	C7
R143	B7
R144	C8
R145	B8
R146	B8
R147	B8
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R149	C7
R152	C8
R153	B7
R154	B7
R155	B8
R156	A7
R158	C7
R159	C7
R159	C8
R161	A8
R162	B7
R163	C4
R166	C8
R167	A8
R169	B8
R171	C5
R172	D4
R173	E7
R174	E7
R175	D7
R177	C5
R178	F7
R179	E7
R179	E7
R181	D7
R182	E7
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R183	C5
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R185	F7
R186	F7
R187	D7
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R196	D7
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R208	D8
R209	B5
R211	B4
R212	B4
R213	A4
R214	B4
R215	B4
R216	F7
R217	E7
R218	D7
R219	D7
R221	C4
R222	C4
R223	B4
R224	A4
R226	D8
R227	C4
R228	A6
R229	C2
R231	F8
R232	F8
R234	A6
R235	A6
R236	D8
R237	D8
R238	E6
R239	E5
R241	E6
R242	E5
R243	E2
R244	E2
R245	E1
R246	A2
R247	F5
R248	F5
R249	F5
R253	D5
R254	F5
R255	D5
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R263	D3
R264	D1
R265	E1
R266	E1
R267	F4
R268	D4
R271	E4
R273	E4
R275	E3
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R277	D3
R278	D2
R279	D2
R281	D2
R283	F4
R284	D2
R285	D2
R286	E2
R287	E2
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R294	D2
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R318	B3
R319	B3
R321	B3
R323	B2
R324	C3
R325	C2
R326	C1
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R327	B3
R328	B2
R329	B1
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R332	C2
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R334	B2
R335	C2
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R345	C2
R346	B2
R347	B1
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T141	D3
T142	D2
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T145	D2
T146	D2
T147	C2
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T149	C3
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T156	B2
T157	B1
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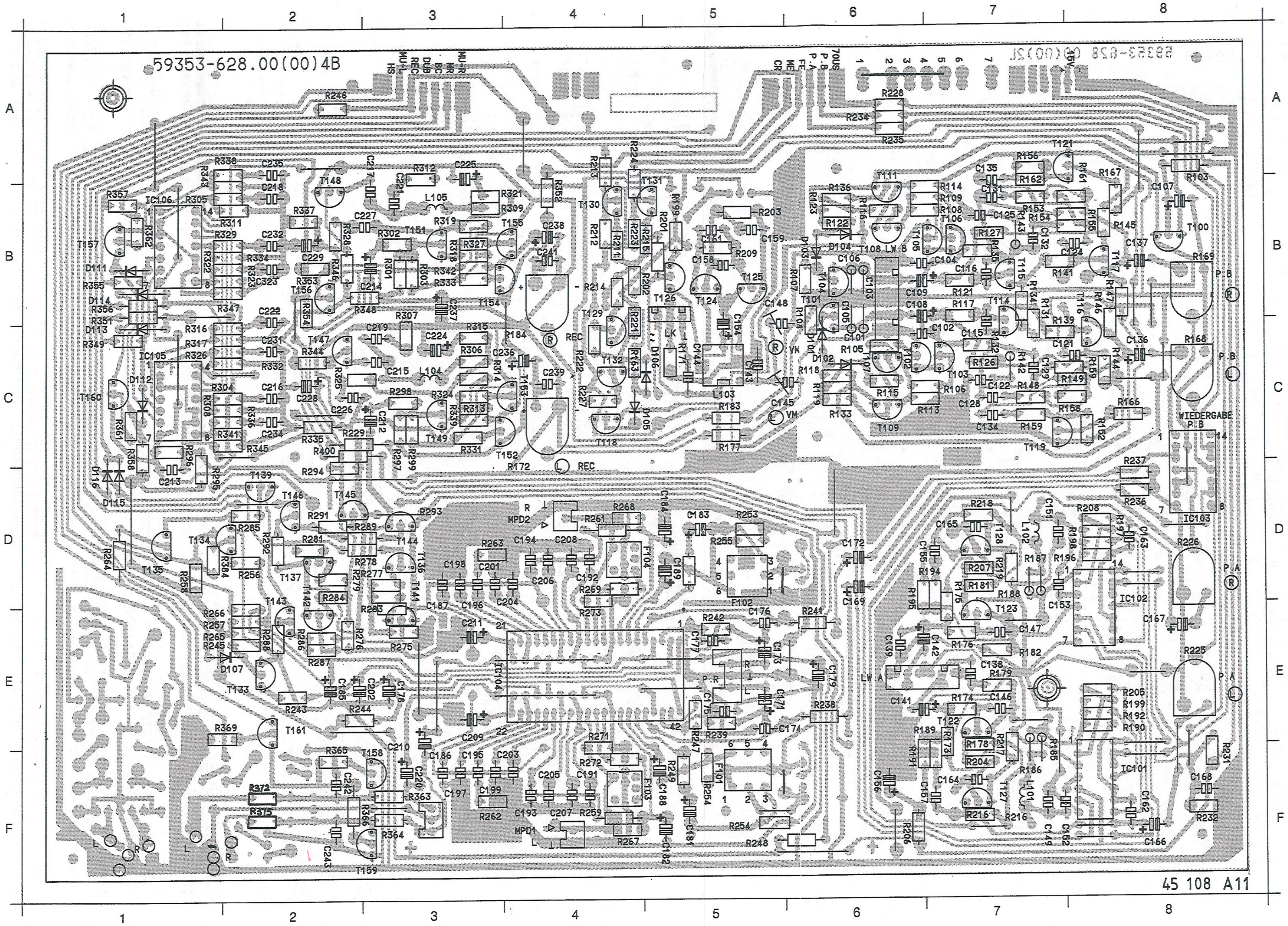
T158	F2
T159	F2
T160	C1
T161	E2
IC101	F8
IC102	E8
IC103	D8
IC104	E3
IC105	C1
IC106	B1

AF PANEL



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C105	B6	C235	A2	R191	F6	R319	B3	IC101	F8
C106	B6	C236	C3	R194	D6	R321	B3	IC102	E8
C107	B8	C237	B3	R196	D7	R323	B2	IC103	D8
C108	B6	C238	B4	R197	D8	R324	C3	IC104	E3
C109	B6	C239	C4	R198	D7	R325	C2	IC105	C1
C115	C7	C241	B4	R199	B5	R326	C1	IC106	B1
C116	B7	C242	F2	R199	E8	R326	D1		
C121	C7	C243	F2	R201	B5	R327	B3		
C122	C7	C259	F4	R202	B4	R328	B2		
C124	B7	C323	B2	R203	B5	R329	B1		
C125	B7	D101	C6	R204	F7	R331	C3		
C129	C7	D102	C6	R205	E8	R332	B1		
C131	B7	D103	B6	R206	F6	R332	C2		
C132	B7	D104	B6	R207	D7	R333	B3		
C134	C7	D105	C4	R208	D8	R334	B2		
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C138	E7	D111	B1	R212	B4	R337	B2		
C139	E6	D112	C1	R213	A4	R338	A1		
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C142	E7	D114	B1	R215	B4	R341	C1		
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C146	E7	F101	F5	R219	D7	R345	C2		
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C153	E7	L103	C5	R227	C4	R353	B2		
C154	C5	L104	C3	R228	A6	R354	B2		
C155	D6	L105	B3	R229	C2	R355	B1		
C156	F6	R103	B8	R231	F8	R356	B1		
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C168	F8	R116	B6	R243	E2	R372	F1		
C169	E6	R116	B7	R244	E2	R375	F1		
C171	E5	R118	C6	R245	E1	R384	D2		
C172	D6	R119	C6	R246	A2	R396	C1		
C173	E5	R121	B7	R247	F5	R400	C2		
C174	E5	R122	B6	R248	F5	T100	B8		
C175	E5	R123	B6	R249	F5	T101	B6		
C176	E5	R126	C7	R253	D5	T102	C6		
C177	E5	R126	C7	R254	F5	T103	C7		
C178	E3	R127	B7	R255	D5	T104	B6		
C179	E6	R131	B7	R256	D2	T105	B6		
C181	F5	R132	C7	R257	E1	T106	B7		
C182	F5	R133	C6	R258	D1	T107	C6		
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C184	D5	R135	B7	R262	F3	T109	C6		
C185	E2	R136	B6	R263	D3	T111	B6		
C186	F3	R139	C7	R264	D1	T114	B7		
C187	E3	R141	B7	R265	E1	T115	B7		
C188	F5	R142	C7	R266	E1	T116	B8		
C189	D5	R143	B7	R267	F4	T117	B8		
C191	F4	R144	C8	R268	D4	T118	C4		
C192	D4	R145	B8	R271	E4	T119	C7		
C193	F3	R146	B8	R273	E4	T121	A7		
C194	D4	R147	B8	R275	E3	T122	E7		
C195	F3	R148	C7	R276	E2	T123	E7		
C196	E3	R149	C7	R277	D3	T123	E7		
C197	F3	R152	C8	R278	D2	T124	B5		
C198	D3	R153	B7	R279	D2	T125	B5		
C199	F3	R154	B7	R281	D2	T126	B5		
C201	D3	R155	B8	R283	F4	T127	F7		
C202	E3	R156	A7	R284	D2	T128	D7		
C203	F3	R158	C7	R285	D2	T129	B4		
C204	E4	R159	C7	R286	E2	T131	B4		
C205	F4	R159	C8	R287	E2	T132	C4		
C206	D4	R161	A8	R288	E2	T133	E2		
C207	F4	R162	B7	R289	D2	T134	D1		
C208	D4	R163	C4	R291	D2	T135	D1		
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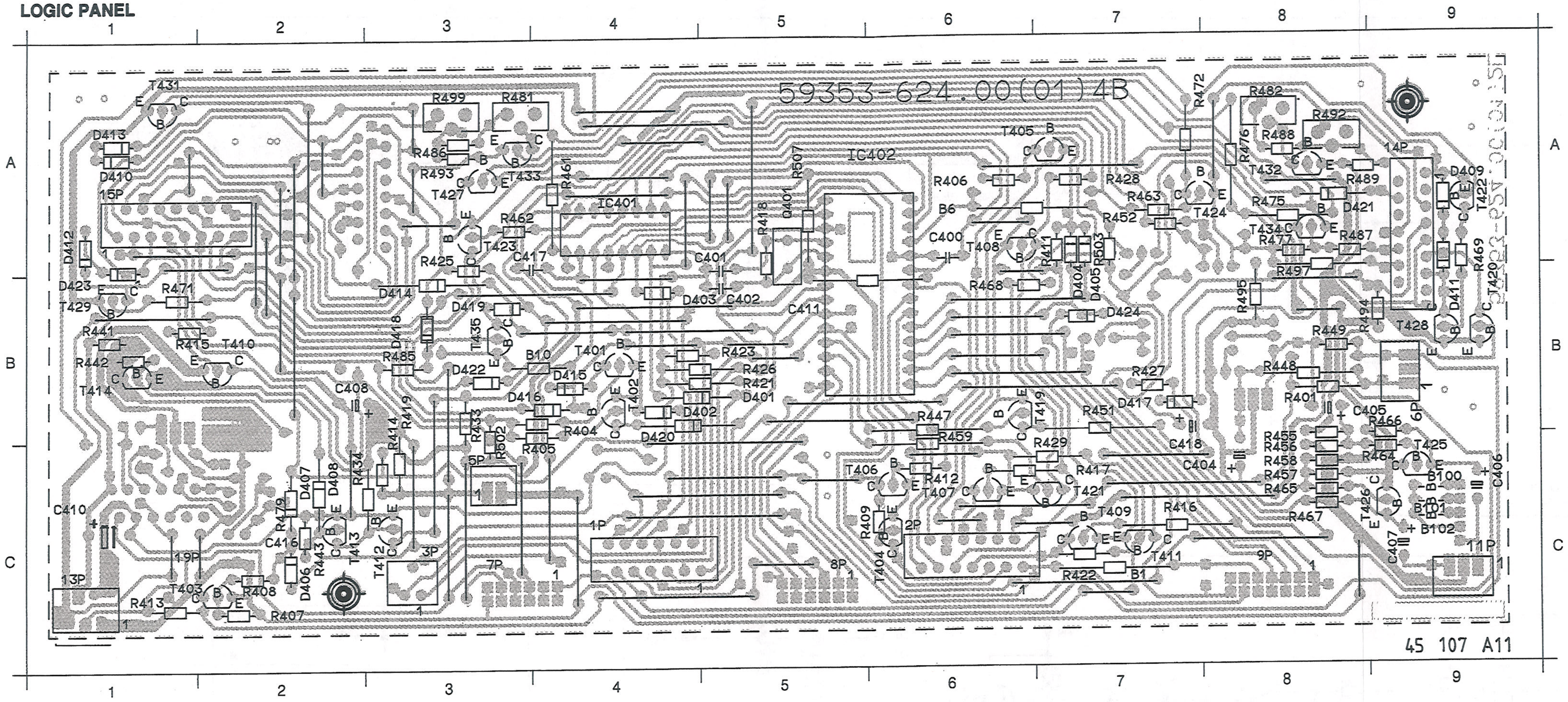
C212	C3	R171	C5	R297	C3	T141	D3		
C213	D1	R172	D4	R298	C3	T142	D2		
C214	B2	R173	E7	R299	C3	T143	E2		
C215	C3	R174	E7	R301	B3	T144	D3		
C216	C2	R175	D7	R302	B3	T145	D2		
C217	A3	R177	C5	R303	B3	T146	D2		
C218	B2	R178	F7	R304	C1	T147	C2		
C219	C3	R179	E7	R305	B1	T148	B2		
C220	F3	R179	E7	R306	C3	T149	C3		
C221	B3	R181	D7	R307	B3	T151	B3		
C222	B2	R182	E7	R308	C1	T152	C3		
C224	C3	R182	E8	R309	B3	T153	C4		
C225	A3	R183	C5	R311	B1	T154	B3		
C226	C2	R184	C3	R312	A3	T156	B2		
C227	B2	R185	F7	R313	C3	T157	B1		
C228	C2	R186	F7	R314	C3	T158	B3		
C229	B2	R187	D7	R315	C3	T158	F2		

CS 26 106

LOGIC PANEL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IC402
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B6 B10 B100 B101 B102
T401 T402 T403 T404 T405 T406 T407 T408 T409 T410 T411 T412 T413 T414 T419 T420 T421 T422 T423 T424 T425 T426 T427 T428 T429 T431 T432 T433 T434 T435
C400 C401 C402 C404 C405 C406 C407 C408 C410 C411 C416 C417 C418
D401 D402 D403 D404 D405 D406 D407 D408 D409 D410 D411 D412 D413 D414 D415 D416 D417 D418 D419 D420 D421 D422 D423 D424
Q401
R401 R404 R405 R406 R407 R408 R409 R411 R412 R413 R414 R415 R416 R417 R418 R419 R421 R422 R423 R425 R426 R427 R428 R429 R433 R434 R441 R442 R443 R447 R448 R449 R451 R452 R455 R456 R457 R458 R459 R461 R462 R463 R464 R465 R466 R467 R468 R469 R471 R472 R475 R476 R477 R479 R481 R482 R485 R486 R487 R488 R489 R492 R493 R494 R495 R497 R499 R502 R503 R507

1P	C4	R417	C7	T405	A6
2P	C6	R418	A5	T406	C5
3P	C3	R419	B3	T407	C6
4P	C4	R421	B5	T408	A6
5P	C3	R423	B5	T409	C7
6P	B9	R425	B3	T410	B2
B6	A6	R426	B5	T411	C7
12P	C1	R427	B7	T412	C3
14P	A9	R428	A7	T413	C2
15P	A1	R429	C6	T414	B1
17P	C8	R433	B3	T415	B7
18P	B1	R434	C2	T416	B8
B10	B3	R438	B7	T417	B8
C400	A6	R439	B7	T418	B7
C401	A4	R441	B1	T419	B6
C402	B5	R442	B1	T420	B9
C403	B7	R443	C2	T421	C7
C408	B2	R444	B7	T422	A9
C410	C1	R445	B7	T423	A3
C411	B5	R446	B7	T424	A8
C412	C2	R447	B6	T427	A3
C413	C1	R448	B8	T428	B9
C417	A3	R449	B8	T429	B1
C418	C7	R451	B7	T431	A1
D401	B5	R452	A7	T433	A3
D402	B4	R453	B1	T433	A8
D403	B4	R454	C1	T434	A8
D404	B7	R459	C6	T435	B3
D405	B7	R461	A4	T436	A7
D406	C2	R462	A3	I C401	A4
D407	C2	R463	A7	I C402	A5
D408	C2	R468	B6		
D409	A9	R469	B9		
D411	B9	R471	B1		
D412	A1	R472	A7		
D413	A1	R475	A8		
D414	A1	R476	A8		
D414	B3	R477	A8		
D415	B4	R478	C2		
D416	B3	R479	C2		
D417	B7	R481	A3		
D418	B3	R482	A8		
D419	B3	R485	B3		
D420	C4	R486	A3		
D421	A8	R487	A8		
D422	B3	R488	A8		
D423	B1	R489	A8		
D424	B7	R492	A8		
Q401	A5	R493	A3		
R401	B8	R494	B8		
R403	B8	R495	B8		
R404	B4	R497	B8		
R405	C3	R499	A3		
R406	A6	R502	C3		
R407	C2	R503	A7		
R408	C2	R504	A7		
R409	C5	R505	B8		
R411	A7	R506	A8		
R412	C6	R507	A5		
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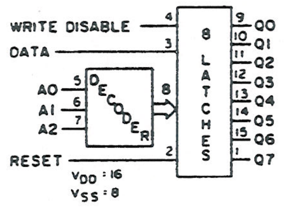
R414	B3	T402	B4		
R415	B1	T403	C1		
R416	C7	T404	C5		

MC14099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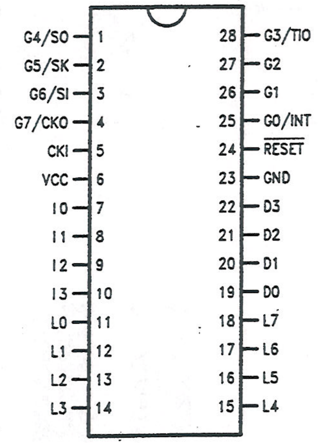
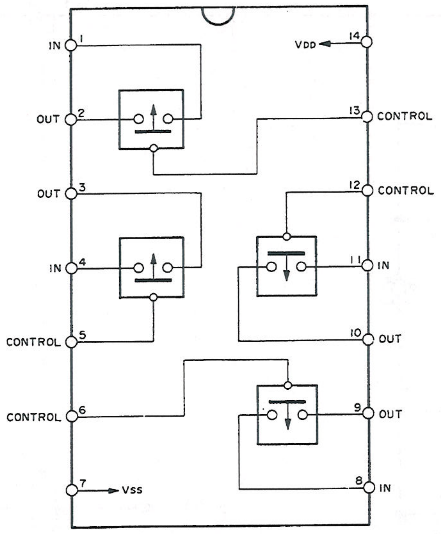
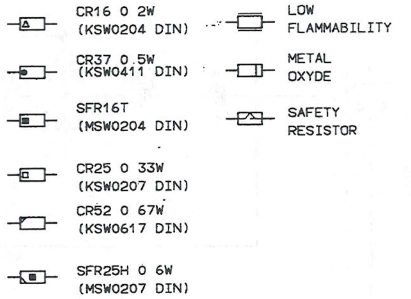
DATA 3
A0 5
A1 6
A2 7
DECODER
RESET 2
8 LATCHES
9 Q0
10 Q1
11 Q2
12 Q3
13 Q4
14 Q5
15 Q6
1 Q7
VDD = 16
VSS = 8

COP840C


G4/SO 1
G5/SK 2
G6/SI 3
G7/CKO 4
CKI 5
VCC 6
I0 7
I1 8
I2 9
I3 10
L0 11
L1 12
L2 13
L3 14
28 G3/TIO
27 G2
26 G1
25 G0/INT
24 RESET
23 GND
22 D3
21 D2
20 D1
19 D0
18 L7
17 L6
16 L5
15 L4

4066BP


IN 1
OUT 2
OUT 3
IN 4
CONTROL 5
CONTROL 6
7 VSS
VDD 14
13 CONTROL
12 CONTROL
11 IN
10 OUT
9 OUT
8 IN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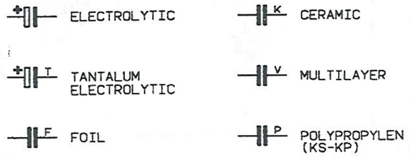
CR37 0.5W (KSW0411 DIN)
SFR16T (MSW0204 DIN)
CR25 0 33W (KSW0207 DIN)
CR52 0 67W (KSW0617 DIN)
SFR25H 0 6W (MSW0207 DIN)
LOW FLAMMABILITY
METAL OXYDE
SAFETY RESISTOR

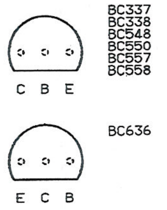
CAPACITOR

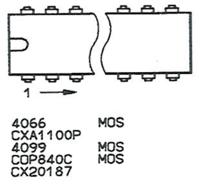

ELECTROLYTIC
TANTALUM ELECTROLYTIC
FOIL
CERAMIC
MULTILAYER
POLYPROPYLEN (KS-KP)

⚠ ABSOLUTELY NECESSARY FOR THE SAFETY OF THE SET. THESE COMPONENTS MEET THE SAFETY REQUIREMENTS ACCORDING TO VDE OR IEC. RESP AND MUST BE REPLACED BY PARTS OF SAME SPECIFICATION ONLY

⬡ MEASUREMENT POINT

○ ALIGNMENT POINT


BC337
BC338
BC548
BC550
BC557
BC558
C B E
BC636
E C B



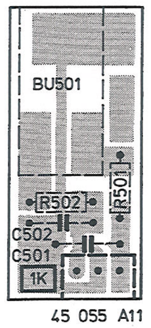
4066 MOS
CXA1100P
4099 MOS
COP840C MOS
CX20187

TOP VIEW

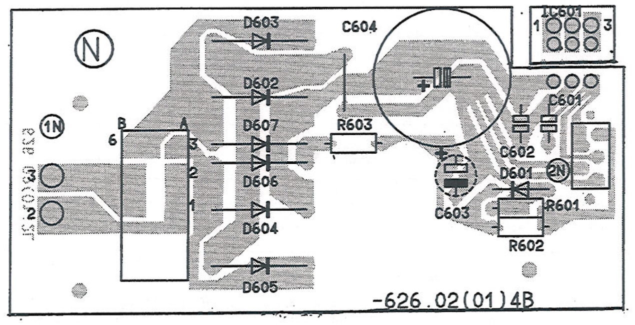
ATTENTION!
OBSERVE MOS COMPONENTS HANDLING INSTRUCTIONS WHEN SERVICING!

IF NOT OTHERWISE INDICATED ALL VOLTAGES ARE MEASURED AGAINST CHASSIS WITH A VOLTMETER (RI=10M) THE VALUES ARE VALID FOR 220V AC MAINS VOLTAGES

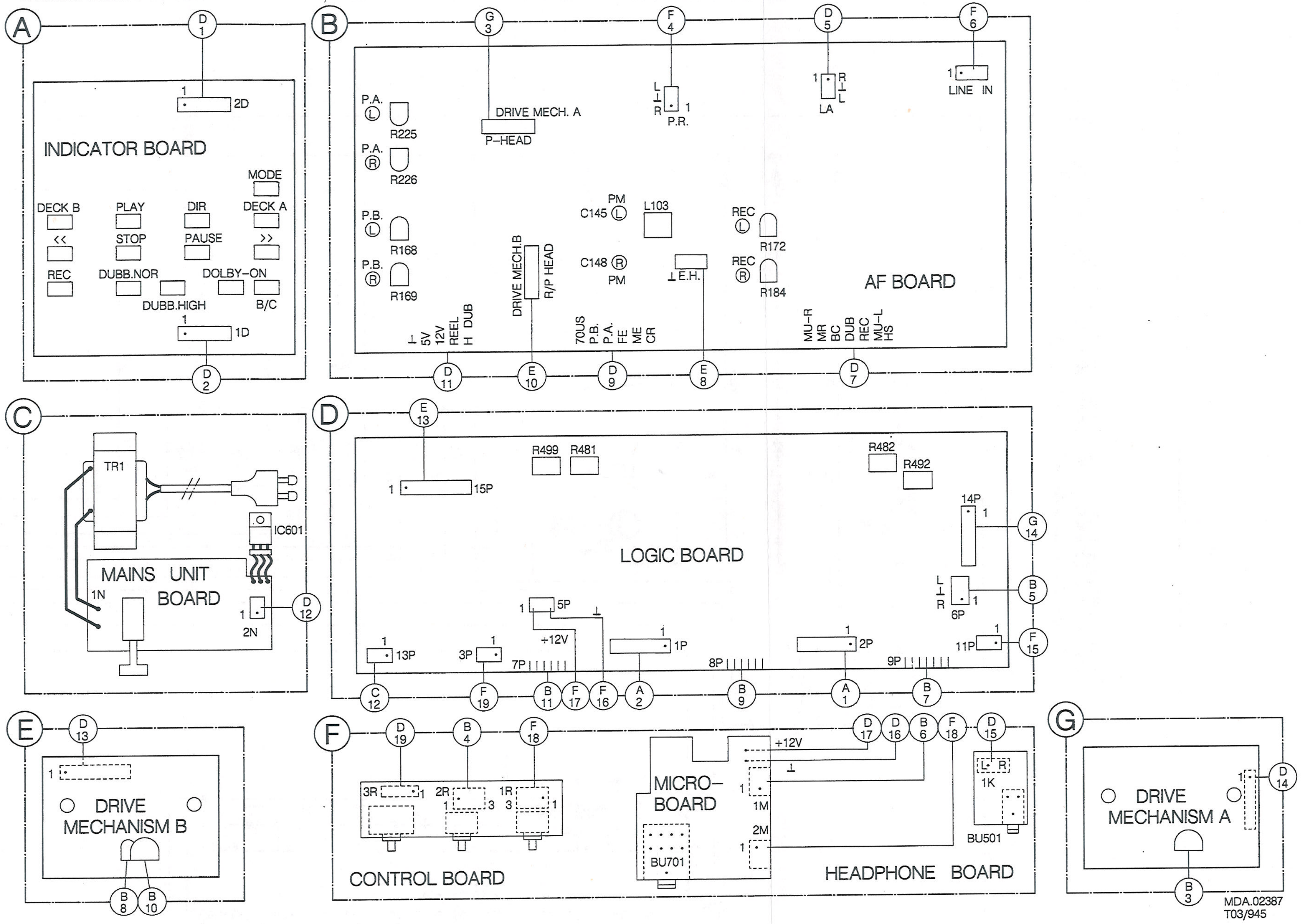
HEADPHONE BOARD


BU501
R502
R501
C502
C501
1K
45 055 A11

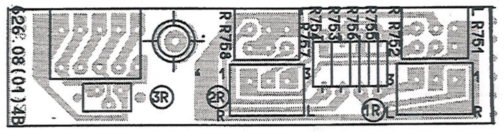
MAINS UNIT BOARD


N
IC601
D603
C604
D602
D607
R603
D606
D604
D605
C601
C602
D601
C603
R601
R602
1N
2N
-626.02(01)4B

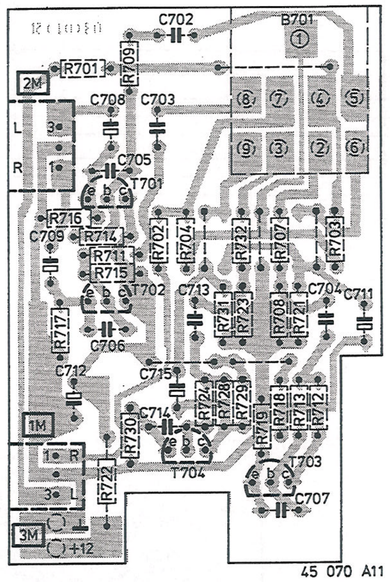
WIRING DIAGRAM

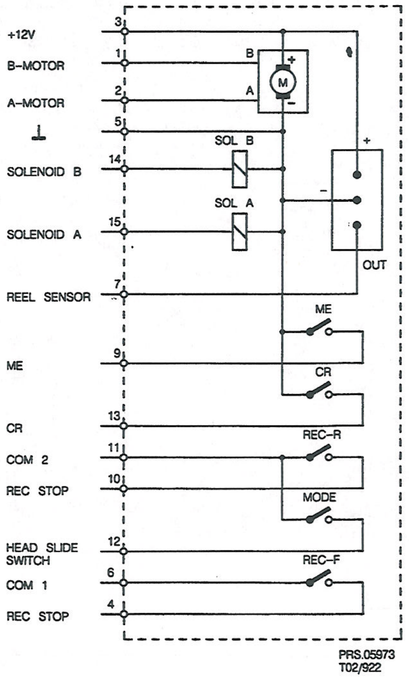

A
INDICATOR BOARD
2D
1D
MODE
DECK B
PLAY
DIR
DECK A
STOP
PAUSE
REC
DUBB.NOR
DOLBY-ON
DUBB.HIGH
B/C
B
DRIVE MECH. A
P-HEAD
P.R.
LA
LINE IN
P.A.
R225
R226
P.B.
R168
R169
DRIVE MECH.B
R/P HEAD
PM
C145
L103
C148
E.H.
REC
R172
R184
AF BOARD
5V
12V
REEL
H DUB
70US
P.B.
P.A.
FE
ME
CR
MU-R
MR
BC
DUB
REC
MU-L
HS
C
TR1
IC601
MAINS UNIT
BOARD
1N
2N
D
LOGIC BOARD
R499
R481
R482
R492
15P
14P
6P
5P
+12V
1P
2P
13P
3P
7P
8P
9P
11P
E
DRIVE
MECHANISM B
F
CONTROL BOARD
3R
2R
1R
MICRO-
BOARD
1M
2M
BU701
+12V
1K
BU501
HEADPHONE BOARD
G
DRIVE
MECHANISM A
MDA.02387
T03/945

CONTROL BOARD

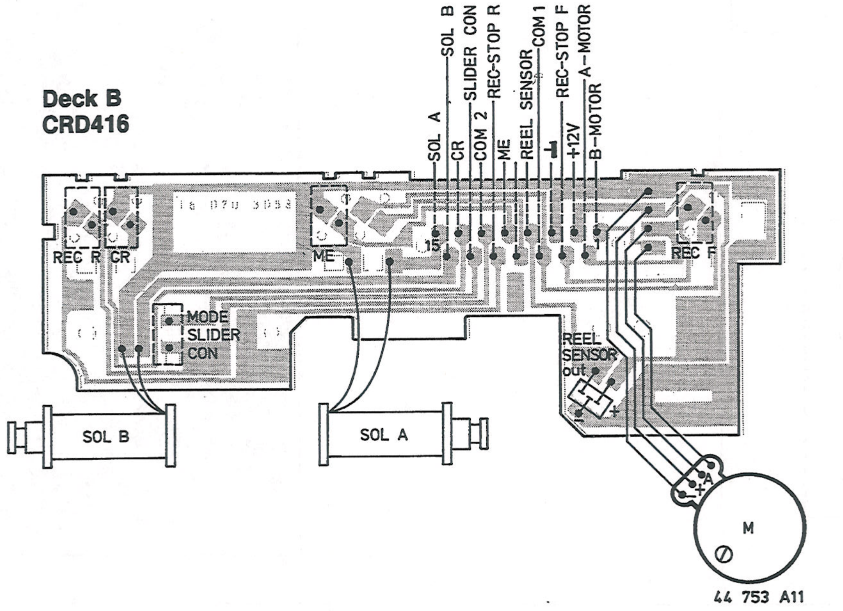

626.08(01)4B
R768
R751
R752
R753
R754
R766
R755
R758
R781
3R
2R
1R

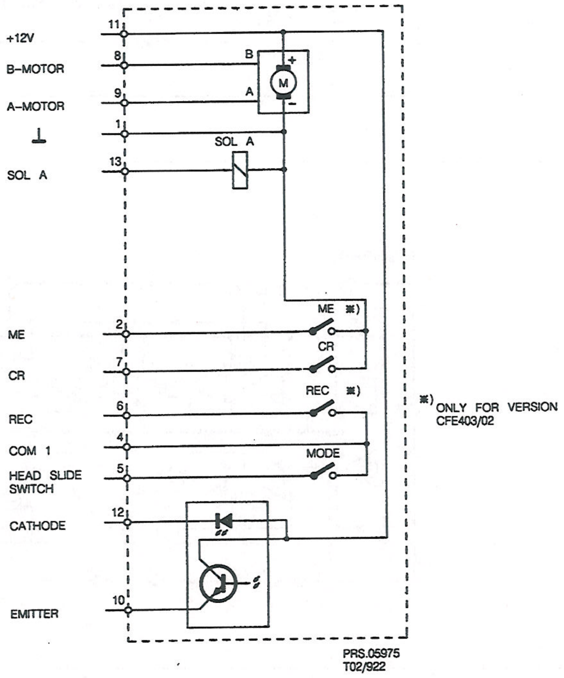
MICRO BOARD


C702
B701
R701
R709
2M
C708
C703
C705
T701
R716
C709
R714
R711
R715
R702
R704
R732
R707
R703
T702
C713
C704
C711
R717
C706
R731
R723
R708
R721
C712
C715
C714
R724
R728
R729
R718
R713
R712
R719
1M
R730
R722
T704
T703
C707
3M
+12
45 070 A11

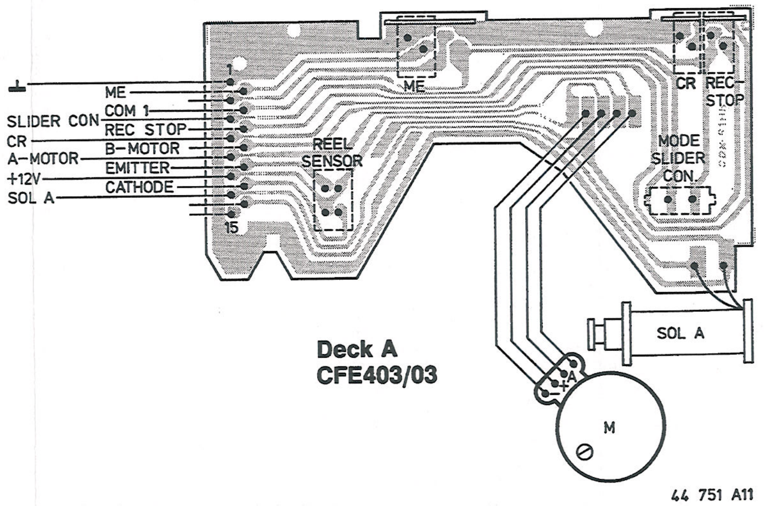

+12V
B-MOTOR
A-MOTOR
SOLENOID B
SOLENOID A
REEL SENSOR
ME
CR
COM 2
REC STOP
HEAD SLIDE SWITCH
COM 1
REC STOP
SOL B
SOL A
M
OUT
REC-R
MODE
REC-F
PRS.05973
T02/922

Deck B
CRD416

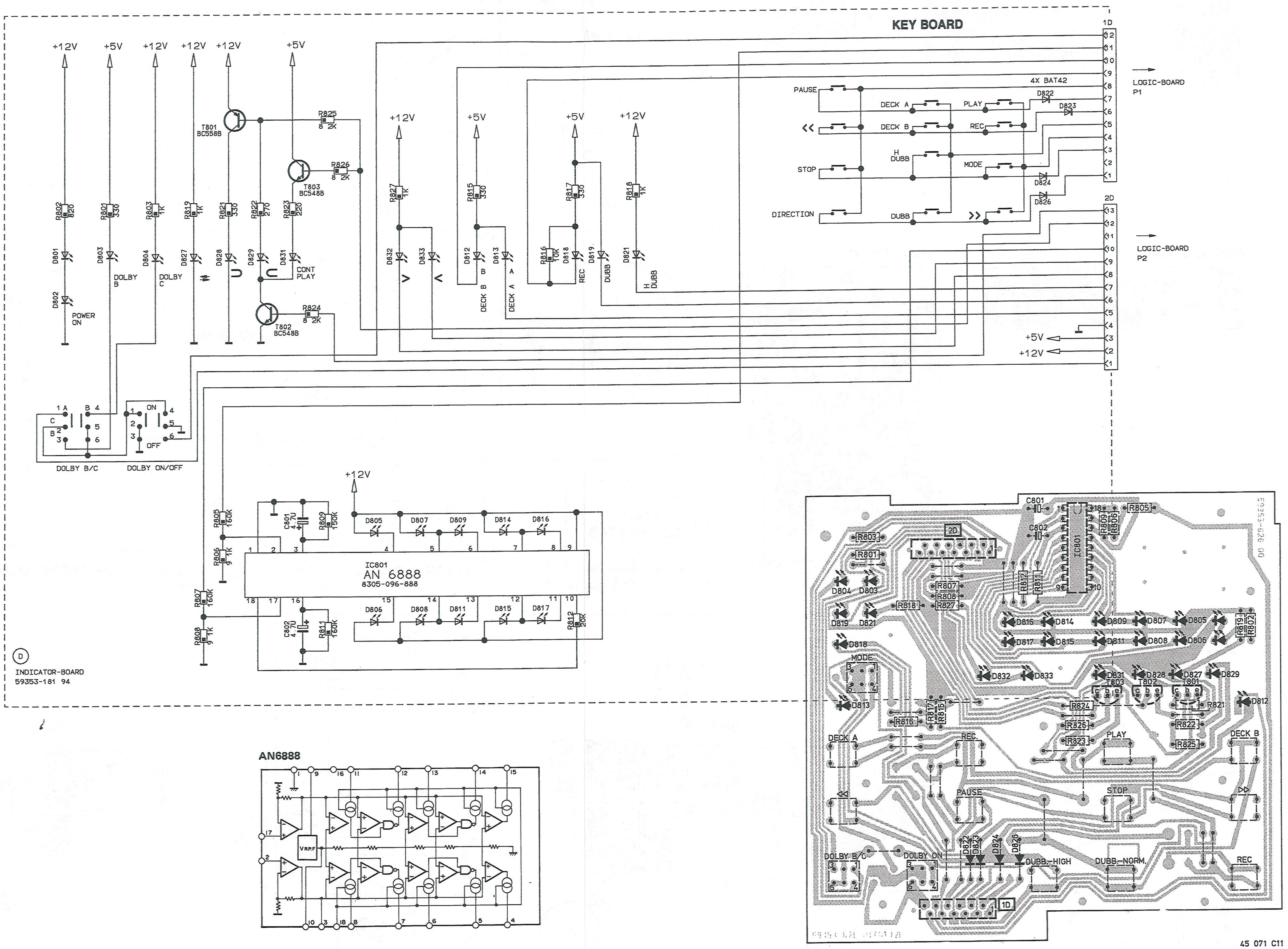

SOL B
SOL A
CR
SLIDER CON
COM 2
REC-STOP R
ME
REEL SENSOR
COM 1
REC-STOP F
+12V
B-MOTOR
A-MOTOR
REC R
CR
ME
REC F
MODE
SLIDER
CON
REEL
SENSOR
out
SOL B
SOL A
M
44 753 A11

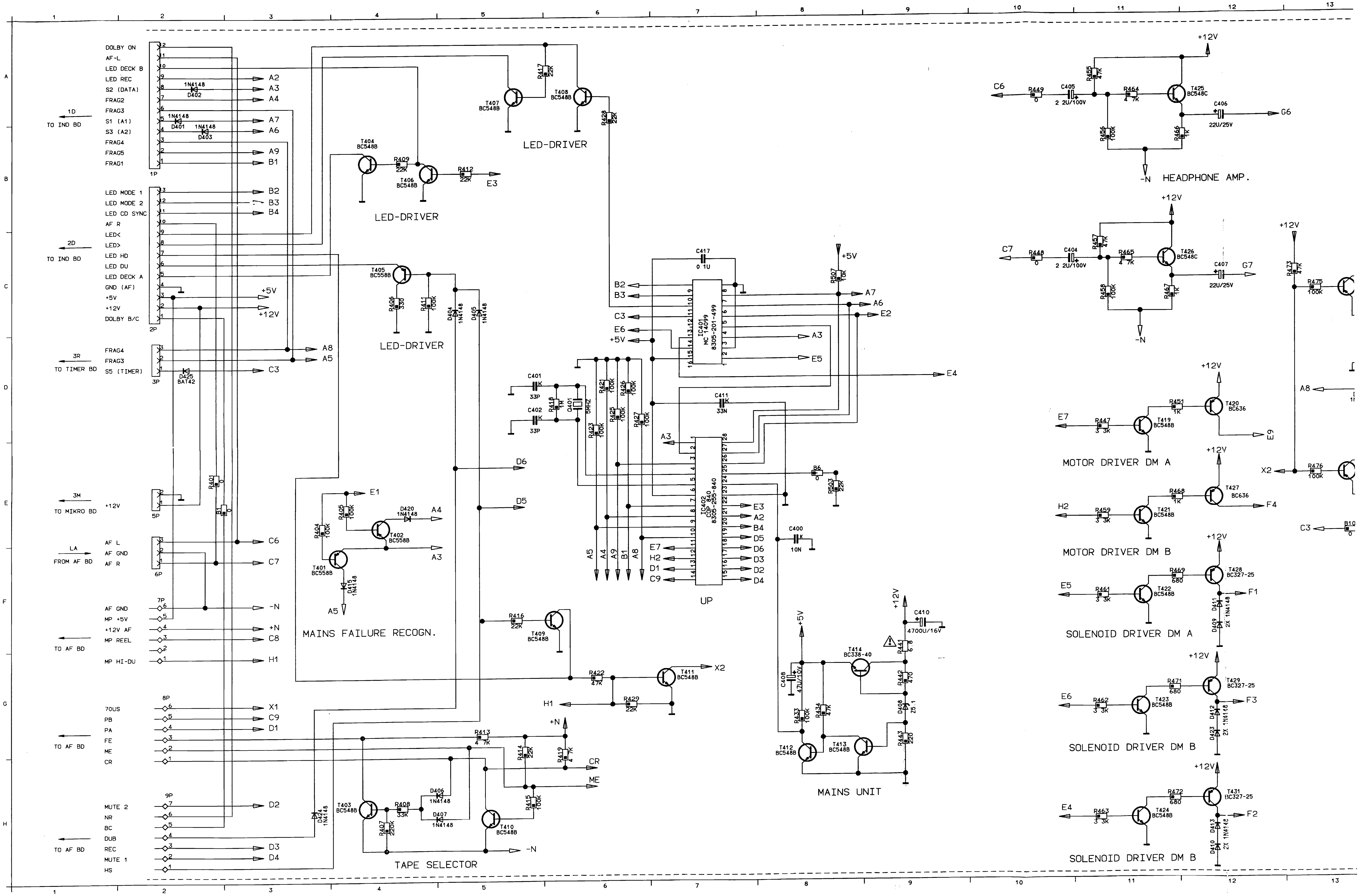

+12V
B-MOTOR
A-MOTOR
SOL A
ME
CR
REC
COM 1
HEAD SLIDE SWITCH
CATHODE
EMITTER
M
SOL A
CR
REC
MODE
*) ONLY FOR VERSION CFE403/02
PRS.05975
T02/922

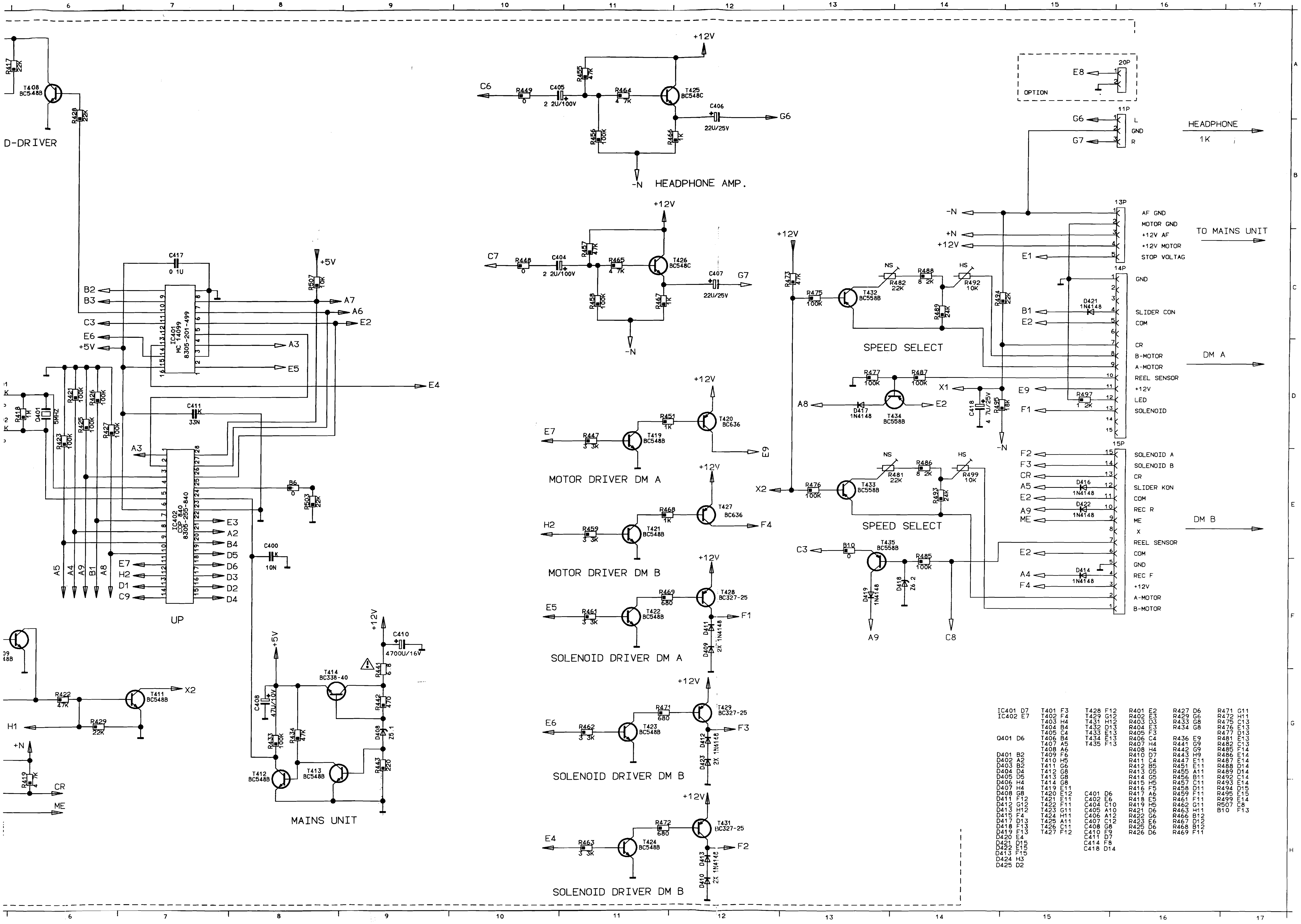
Deck A
CFE403/03


ME
COM 1
SLIDER CON
REC STOP
CR
B-MOTOR
A-MOTOR
EMITTER
+12V
CATHODE
SOL A
REEL
SENSOR
CR
REC
STOP
MODE
SLIDER
CON
SOL A
M
44 751 A11

IC801	F5
T801	B3
T802	D4
T803	B4
D801	C2
D803	C3
D804	C3
D805	E4
D806	F4
D807	E5
D808	F5
D809	E5
D811	F5
D812	C5
D813	C5
D814	E5
D816	E6
D817	F6
D818	C6
D819	C6
D821	C6
D822	B10
D823	B10
D824	C10
D826	C10
D827	C3
C828	C3
C829	C3
C831	C4
C832	C4
D833	C4
C801	E4
C802	F4
C803	F6
R801	C2
R802	C2
R803	C3
R805	E3
R806	E3
R807	F3
R808	F3
R809	E4
R811	F4
R812	F6
R815	C5
R816	C6
R817	C6
R818	C6
R819	C3
R821	C3
R822	C4
R823	C4
R824	D4
R825	B4
R826	C4
R827	C5

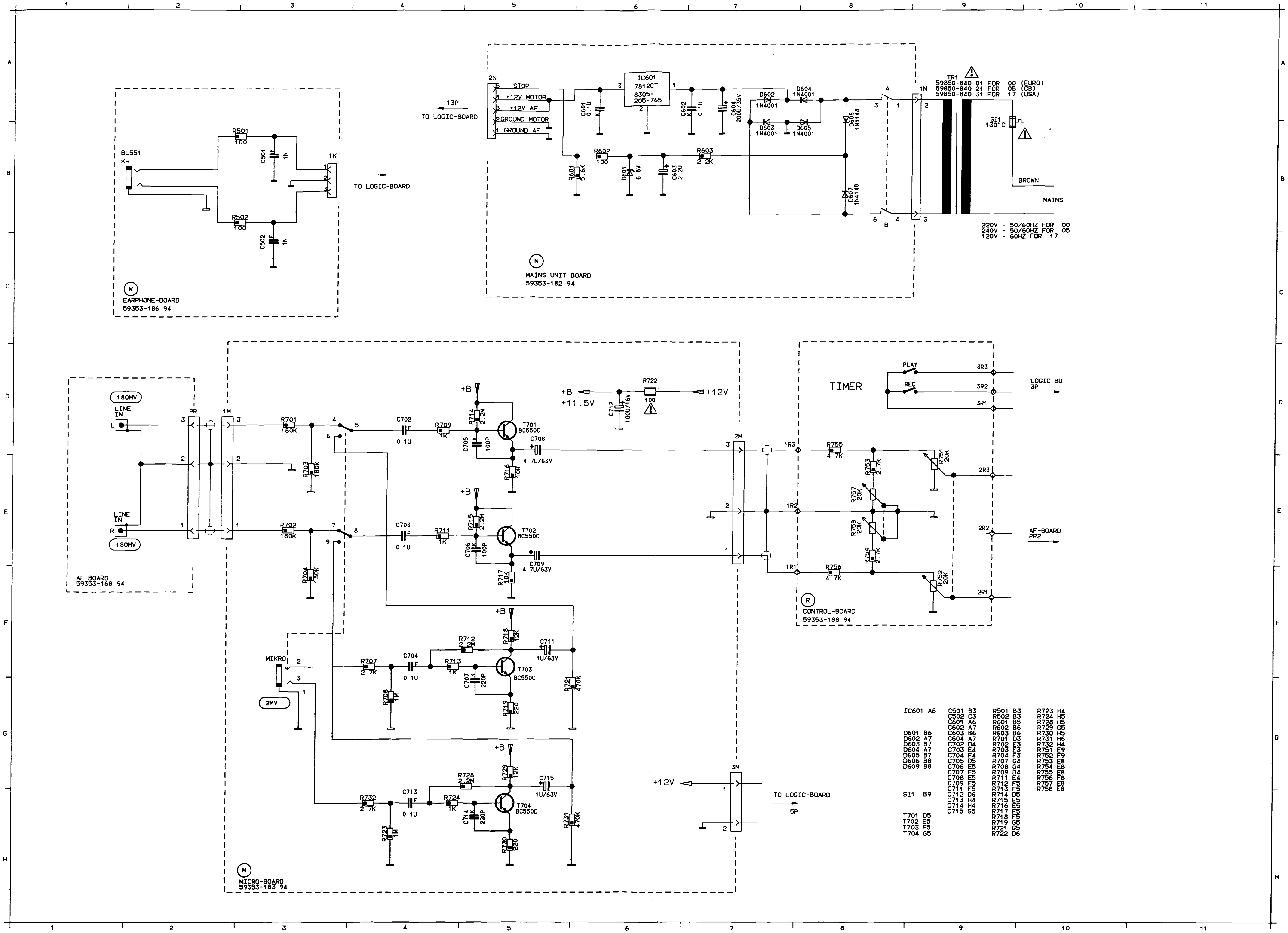

KEY BOARD
1D
LOGIC-BOARD P1
2D
LOGIC-BOARD P2
4X BAT42
PAUSE
DECK A
PLAY
DECK B
REC
H DUBB
MODE
STOP
DIRECTION
DUBB
+12V
+5V
T801 BC558B
T802 BC548B
T803 BC548B
R825 8 2K
R826 8 2K
R824 8 2K
POWER ON
DOLBY B
DOLBY C
CONT PLAY
DECK B
DECK A
REC
DUBB
H DUBB
DOLBY B/C
DOLBY ON/OFF
ON
OFF
IC801
AN 6888
8305-096-888
INDICATOR-BOARD
59353-181 94
AN6888
VRPF
DUBB.-HIGH
DUBB.-NORM.
DOLBY ON
59353-626 00
45 071 C11


1D
TO IND BD
2D
TO IND BD
3R
TO TIMER BD
3M
TO MIKRO BD
LA
FROM AF BD
TO AF BD
TO AF BD
TO AF BD
DOLBY ON
AF-L
LED DECK B
LED REC
S2 (DATA)
FRAG2
FRAG3
S1 (A1)
S3 (A2)
FRAG4
FRAG5
FRAG1
1P
LED MODE 1
LED MODE 2
LED CD SYNC
AF R
LED<
LED>
LED HD
LED DU
LED DECK A
GND (AF)
+5V
+12V
DOLBY B/C
2P
FRAG4
FRAG3
S5 (TIMER)
3P
D425
BAT42
+12V
5P
AF L
AF GND
AF R
6P
AF GND
MP +5V
+12V AF
MP REEL
MP HI-DU
7P
70US
PB
PA
FE
ME
CR
8P
MUTE 2
NR
BC
DUB
REC
MUTE 1
HS
9P
D402
D401
D403
1N4148
LED-DRIVER
LED-DRIVER
LED-DRIVER
T404 BC548B
T406 BC548B
T405 BC558B
T407 BC548B
T408 BC548B
R409 22K
R412 22K
R417 22K
R428 22K
R406 330
R411 100K
D404 1N4148
D405 1N4148
E3
MAINS FAILURE RECOGN.
T401 BC558B
T402 BC558B
R404 100K
R405 100K
D420 1N4148
D415 1N4148
E1
A4
A3
A5
D6
D5
R416 22K
T409 BC548B
R422 47K
R429 22K
T411 BC548B
X2
H1
+N
R413 4 7K
R414 22K
R419 4 7K
R415 100K
CR
ME
T403 BC548B
R408 33K
D406 1N4148
D407 1N4148
T410 BC548B
R407 220K
D424 1N4148
-N
TAPE SELECTOR
C401 33P
C402 33P
R418 1M
Q401 5MHZ
R421 100K
R426 100K
R423 100K
R425 100K
R427 100K
C417 0 1U
IC401 MC 14099 8305-201-499
+5V
R507 10K
B2
B3
C3
E6
+5V
A7
A6
E2
A3
E5
E4
C411 33N
IC402 COP 840 8305-255-840
R6 0
R503 22K
E3
A2
B4
D5
D6
D3
D2
D4
E7
H2
D1
C9
A5 A4 A9 B1 A8
C400 10N
UP
+12V
C410 4700U/16V
C408 47U/10V
T414 BC338-40
R441 6 8
R442 470
D408 25.1
R443 220
R433 100K
R434 47K
T412 BC548B
T413 BC548B
MAINS UNIT
+12V
C6
R449 0
C405 2 2U/100V
R455 47K
R464 4 7K
T425 BC548C
C406 22U/25V
G6
R456 100K
R466 1K
-N
HEADPHONE AMP.
C7
R448 0
C404 2 2U/100V
R457 47K
R465 4 7K
T426 BC548C
C407 22U/25V
G7
R458 100K
R467 1K
-N
E7
R447 3 3K
T419 BC548B
R451 1K
T420 BC636
E9
MOTOR DRIVER DM A
H2
R459 3 3K
T421 BC548B
R468 1K
T427 BC636
F4
MOTOR DRIVER DM B
E5
R461 3 3K
T422 BC548B
R469 680
T428 BC327-25
F1
D411 D409 2X 1N4148
SOLENOID DRIVER DM A
E6
R462 3 3K
T423 BC548B
R471 680
T429 BC327-25
F3
D412 D423 2X 1N4148
SOLENOID DRIVER DM B
E4
R463 3 3K
T424 BC548B
R472 680
T431 BC327-25
F2
D413 D410 2X 1N4148
SOLENOID DRIVER DM B
R473 47K
R475 100K
R476 100K
A8
X2
C3
B10 0
1 2 3 4 5 6 7 8 9 10 11 12 13
A B C D E F G H



D-DRIVER
T408 BC548B
R417 22K
R428 22K
HEADPHONE AMP.
+12V
C6
R449 0
C405 2 2U/100V
R455 47K
R464 4 7K
T425 BC548C
C406 22U/25V
G6
R456 100K
R466 1K
-N
C7
R448 0
C404 2 2U/100V
R457 47K
R465 4 7K
T426 BC548C
C407 22U/25V
G7
R458 100K
R467 1K
OPTION
E8
20P
11P
L
GND
R
HEADPHONE
1K
13P
AF GND
MOTOR GND
+12V AF
+12V MOTOR
STOP VOLTAG
TO MAINS UNIT
-N
+N
+12V
E1
14P
GND
SLIDER CON
COM
CR
B-MOTOR
A-MOTOR
REEL SENSOR
+12V
LED
SOLENOID
DM A
15P
SOLENOID A
SOLENOID B
CR
SLIDER KON
COM
REC R
ME
X
REEL SENSOR
COM
GND
REC F
+12V
A-MOTOR
B-MOTOR
DM B
SPEED SELECT
R473 47K
R475 100K
T432 BC558B
NS
R482 22K
R488 8 2K
HS
R492 10K
R489 24K
R494 22K
B1
E2
D421 1N4148
R477 100K
R487 100K
T434 BC558B
D417 1N4148
A8
X1
C418 4 7U/25V
R495 18K
E9
R497 1 2K
F1
SPEED SELECT
X2
R476 100K
T433 BC558B
R481 22K
R486 8 2K
R499 10K
R493 24K
F2
F3
CR
A5
D416 1N4148
E2
A9
D422 1N4148
ME
E2
A4
D414 1N4148
F4
C3
B10 0
T435 BC558B
R485 100K
D419 1N4148
D418 Z6 2
A9
C8
MOTOR DRIVER DM A
E7
R447 3 3K
T419 BC548B
R451 1K
T420 BC636
E9
MOTOR DRIVER DM B
H2
R459 3 3K
T421 BC548B
R468 1K
T427 BC636
F4
SOLENOID DRIVER DM A
E5
R461 3 3K
T422 BC548B
R469 680
T428 BC327-25
F1
D411 D409 2X 1N4148
SOLENOID DRIVER DM B
E6
R462 3 3K
T423 BC548B
R471 680
T429 BC327-25
F3
D412 D423 2X 1N4148
SOLENOID DRIVER DM B
E4
R463 3 3K
T424 BC548B
R472 680
T431 BC327-25
F2
D413 D410 2X 1N4148
UP
IC401 MC14099 8305-201-499
C417 0 1U
B2
B3
C3
E6
+5V
+5V
R507 10K
A7
A6
E2
A3
E5
E4
IC402 CDP 840 8305-255-840
C411 33N
A3
B6 0
R503 22K
E3
A2
B4
D5
D6
D3
D2
D4
E7
H2
D1
C9
C400 10N
A5
A4
A9
B1
A8
R421 100K
R426 100K
R418 1M
Q401 5MHZ
R423 100K
R425 100K
R427 100K
MAINS UNIT
+12V
C410 4700U/16V
+5V
C408 47U/10V
T414 BC338-40
R441 6 8
R442 470
D408 Z5 1
R443 220
R433 100K
R434 47K
T412 BC548B
T413 BC548B
T411 BC548B
X2
R422 47K
R429 22K
H1
+N
R419 4 7K
CR
ME
6
7
8
9
10
11
12
13
14
15
16
17
A
B
C
D
E
F
G
H

IC401	D7
IC402	E7
Q401	D6
D401	B2
D402	A2
D403	B2
D404	D4
D405	D5
D406	H4
D407	H4
D408	G8
D411	F12
D412	G12
D413	H12
D415	F4
D417	D13
D418	F13
D419	F13
D420	E4
D421	D15
D422	E15
D413	F15
D424	H3
D425	D2
T401	F3
T402	F4
T403	H4
T404	B4
T405	C4
T406	B4
T407	A5
T408	A6
T409	F6
T410	H5
T411	G6
T412	G8
T413	G8
T414	G8
T419	E11
T420	E12
T421	E11
T422	F11
T423	G11
T424	H11
T425	A11
T426	C11
T427	F12
T428	F12
T429	G12
T431	H12
T432	D13
T433	E13
T434	E13
T435	F13
C401	D6
C402	E6
C404	C10
C405	A10
C406	A12
C407	C12
C408	G8
C410	F9
C411	D7
C414	F8
C418	D14
R401	E2
R402	E3
R403	D3
R404	E3
R405	F3
R406	C4
R407	H4
R408	H4
R410	D7
R411	C4
R412	B5
R413	G5
R414	G5
R415	H5
R416	F5
R417	A6
R418	E5
R419	H5
R421	D6
R422	G6
R423	E6
R425	D6
R426	D6
R427	D6
R429	G6
R433	G8
R434	G8
R436	E9
R441	G9
R442	G9
R443	H9
R447	E11
R451	E11
R455	A11
R456	B11
R457	C11
R458	D11
R459	F11
R461	F11
R462	G11
R463	H11
R466	B12
R467	D12
R468	B12
R469	F11
R471	G11
R472	H11
R475	C13
R476	E13
R477	D13
R481	E13
R482	C13
R485	F14
R486	E14
R487	E14
R488	D14
R489	D14
R492	C14
R493	E14
R494	D15
R495	E15
R499	E14
R507	C8
B10	F13


EARPHONE-BOARD
59353-186 94
BU551
KH
R501
100
R502
100
C501
1N
C502
1N
1K
TO LOGIC-BOARD
13P
TO LOGIC-BOARD
2N
STOP
+12V MOTOR
+12V AF
GROUND MOTOR
GROUND AF
IC601
7812CT
8305-
205-765
C601
0 1U
C602
0 1U
C604
200U/35V
D602
1N4001
D603
1N4001
D604
1N4001
D605
1N4001
D606
1N4148
D607
1N4148
R601
5 6K
R602
100
D601
6 8V
C603
2 2U
R603
2 2K
MAINS UNIT BOARD
59353-182 94
TR1
59850-840 01 FOR 00 (EURO)
59850-840 21 FOR 05 (GB)
59850-840 31 FOR 17 (USA)
1N
SI1
130°C
BROWN
MAINS
220V - 50/60HZ FOR 00
240V - 50/60HZ FOR 05
120V - 60HZ FOR 17
180MV
LINE IN
L
R
AF-BOARD
59353-168 94
PR
1M
R701
180K
R702
180K
R703
180K
R704
180K
C702
0 1U
C703
0 1U
R709
1K
R711
1K
R714
2 2M
R715
2 2M
C705
100P
C706
100P
T701
BC550C
T702
BC550C
C708
4 7U/63V
C709
4 7U/63V
R716
10K
R717
10K
+B
+11.5V
C712
100U/16V
R722
100
+12V
MIKRO
2MV
R707
2 7K
R708
1M
C704
0 1U
R712
2 2M
R713
1K
C707
220P
R718
12K
C711
1U/63V
T703
BC550C
R719
220
R721
470K
R732
2 7K
R723
1M
C713
0 1U
R728
2 2M
R724
1K
C714
220P
R729
12K
C715
1U/63V
T704
BC550C
R730
220
R731
470K
MICRO-BOARD
59353-183 94
2M
3M
TO LOGIC-BOARD
5P
TIMER
PLAY
REC
3R3
3R2
3R1
LOGIC BD
3P
1R3
1R2
1R1
R755
4 7K
R756
4 7K
R753
2 7K
R754
2 7K
R757
20K
R758
20K
R751
20K
R752
20K
2R3
2R2
2R1
AF-BOARD
PR2
CONTROL-BOARD
59353-188 94
K
N
M
R
A
B
C
D
E
F
G
H
1
2
3
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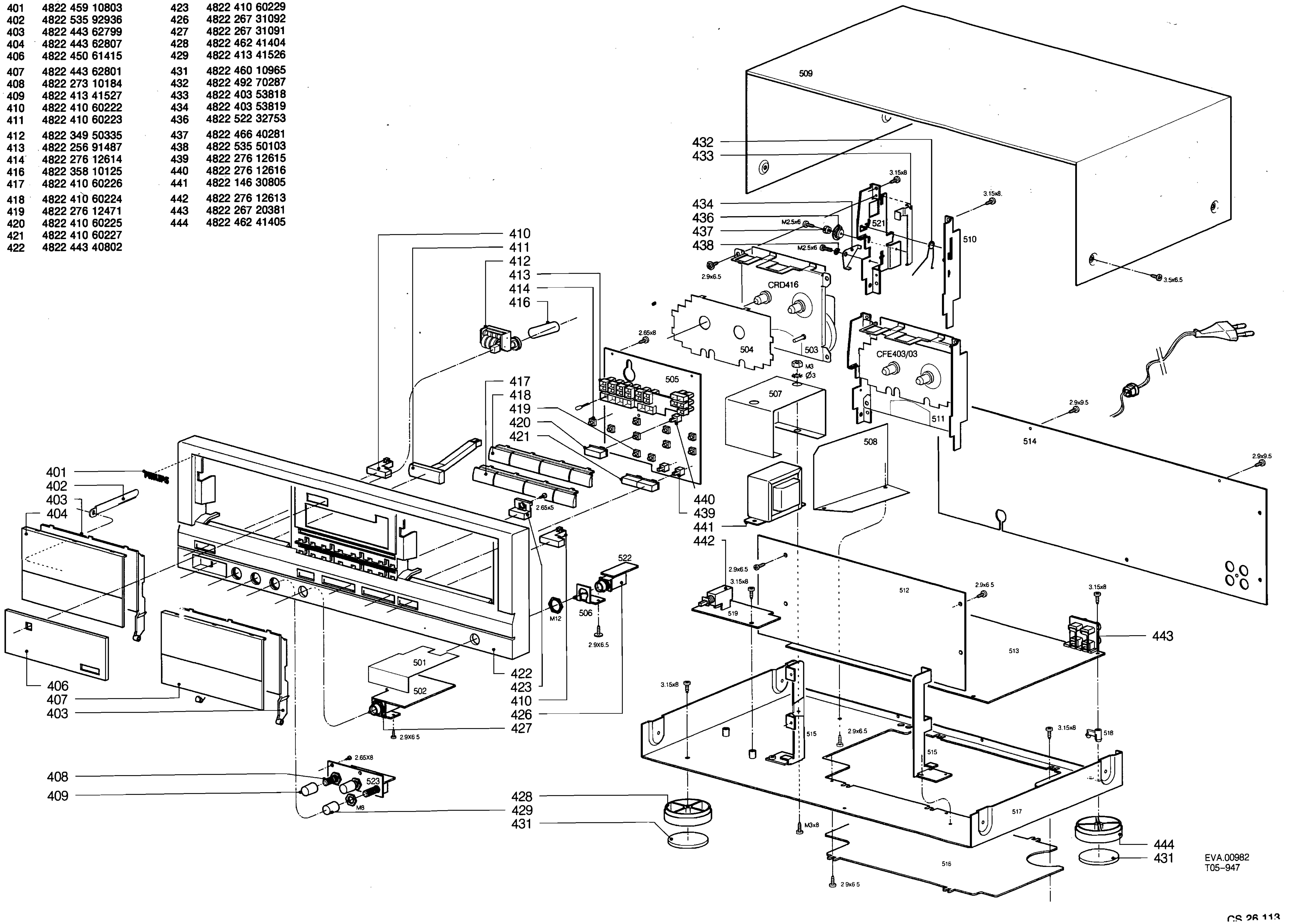
IC601	A6	C501	B3	R501	B3	R723	H4
		C502	C3	R502	B3	R724	H5
		C601	A6	R601	B5	R728	H5
		C602	A7	R602	B6	R729	G5
D601	B6	C603	B6	R603	B6	R730	H5
D602	A7	C604	A7	R701	D3	R731	H6
D603	B7	C702	D4	R702	E3	R732	H4
D604	A7	C703	E4	R703	E3	R751	E9
D605	B7	C704	F4	R704	F3	R752	F9
D606	B8	C705	D5	R707	G4	R753	E8
D609	B8	C706	E5	R708	G4	R754	E8
		C707	F5	R709	D4	R755	E8
		C708	E5	R711	E4	R756	F8
		C709	F5	R712	F5	R757	E8
		C711	F5	R713	F5	R758	E8
SI1	B9	C712	D6	R714	D5		
		C713	H4	R715	E5		
		C714	H4	R716	E5		
		C715	G5	R717	F5		
T701	D5			R718	F5		
T702	E5			R719	G5		
T703	F5			R721	G5		
T704	G5			R722	D6		

CS 26 110

401	4822 459 10803
402	4822 535 92936
403	4822 443 62799
404	4822 443 62807
406	4822 450 61415
407	4822 443 62801
408	4822 273 10184
409	4822 413 41527
410	4822 410 60222
411	4822 410 60223
412	4822 349 50335
413	4822 256 91487
414	4822 276 12614
416	4822 358 10125
417	4822 410 60226
418	4822 410 60224
419	4822 276 12471
420	4822 410 60225
421	4822 410 60227
422	4822 443 40802
423	4822 410 60229
426	4822 267 31092
427	4822 267 31091
428	4822 462 41404
429	4822 413 41526
431	4822 460 10965
432	4822 492 70287
433	4822 403 53818
434	4822 403 53819
436	4822 522 32753
437	4822 466 40281
438	4822 535 50103
439	4822 276 12615
440	4822 276 12616
441	4822 146 30805
442	4822 276 12613
443	4822 267 20381
444	4822 462 41405


509
432
433
3.15x8
3.15x8.
434
436
437
438
M2.5x6
M2.5x6
521
510
2.9x6.5
3.5x6.5
CRD416
410
411
412
413
414
416
2.65x8
504
503
M3
Ø3
CFE403/03
505
507
511
417
418
419
420
421
2.9x9.5
514
2.9x9.5
508
401
402
403
404
2.65x5
440
439
441
442
522
2.9x6.5
3.15x8
512
2.9x6.5
3.15x8
519
M12
506
2.9X6.5
443
513
501
406
407
403
422
423
410
426
427
502
2.9X6.5
3.15x8
515
2.9x6.5
515
3.15x8
518
2.65X8
408
409
523
M8
428
429
431
M3x8
517
516
2.9x6.5
444
431
EVA.00982
T05-947

CS 26 113

4822 209 83146	AN 6888
4822 209 61253	COP840C-UZR/N
4822 209 73092	CX20187
4822 209 81726	MC7812CT
4822 209 80735	MC14066BCP/HEF4066BP
4822 209 11414	MC14099BCP/HEF4099BP

4822 130 41246	BC327-25
4822 130 40981	BC337-25
5322 130 44779	BC338-40
4822 130 40937	BC548B
4822 130 44196	BC548C
4822 130 41096	BC550C
4822 130 44568	BC557B
4822 130 44197	BC558B
4822 130 61755	BC560C
4822 130 44283	BC636

4822 130 31353	BAT42/BAT43
4822 130 81563	LED LGK380 N,P
4822 130 81564	LED LSK380 N,P
4822 130 81005	ZENER 5.1C 0.5W
4822 130 81006	ZENER 6.2C 0.5W
4822 130 33783	ZENER 6.8C 0.5W
4822 130 31438	1N4001
4822 130 30621	1N4148

L101	4822 157 60203	4.7 mH coil
L102	4822 157 60203	4.7 mH coil
L103	4822 157 60198	Oscillator coil
L104	4822 157 60202	4.7 mH coil
L105	4822 157 60204	4.7 mH coil
F101	4822 242 72602	Filter 19kHz
F102	4822 242 72602	Filter 19kHz
F103	4822 242 72603	Filter 19.8kHz
F104	4822 242 72603	Filter 19.8kHz
Q401	4822 242 72604	Cer. resonator 95

C102	4822 122 33571	Cap. cer. 100 pF 5% N750
C104	4822 122 33571	Cap. cer. 100 pF 5% N750
C115	4822 122 33571	Cap. cer. 100 pF 5% N750
C116	4822 122 33571	Cap. cer. 100 pF 5% N750
C121	4822 122 33571	Cap. cer. 100 pF 5% N750
C124	4822 122 33571	Cap. cer. 100 pF 5% N750
C128	4822 122 33571	Cap. cer. 100 pF 5% N750
C131	4822 122 33571	Cap. cer. 100 pF 5% N750
C138	4822 126 10215	Cap. cer. 150 pF 5% N750
C139	4822 126 10215	Cap. cer. 150 pF 5% N750
C145	4822 125 50415	Cap. trim. 15/100 pF VCT56
C148	4822 125 50415	Cap. trim. 15/100 pF VCT56
C155	4822 122 33571	Cap. cer. 100 pF 5% N750
C157	4822 122 33571	Cap. cer. 100 pF 5% N750
C174	4822 126 10216	Cap. cer. 220 pF 5% N750
C175	4822 126 10216	Cap. cer. 220 pF 5% N750
C176	4822 126 10216	Cap. cer. 220 pF 5% N750
C177	4822 126 10216	Cap. cer. 220 pF 5% N750
C242	4822 122 33571	Cap. cer. 100 pF 5% N750
C243	4822 122 33571	Cap. cer. 100 pF 5% N750
C381	4822 126 10127	Cap. cer. 1000 pF 5% N750
C382	4822 126 10127	Cap. cer. 1000 pF 5% N750
C604	4822 124 41759	Cap. elect. 2200 µF 35V

R168	4822 100 11526	22K LIN TRIM
R169	4822 100 11526	22K LIN TRIM
R172	4822 100 11526	22K LIN TRIM
R184	4822 100 11526	22K LIN TRIM
R199	4822 116 81859	22E 5% safety res.
R225	4822 100 11526	22K LIN TRIM
R226	4822 100 11526	22K LIN TRIM
R248	4822 116 81859	22E 5% safety res.
R352	4822 116 81858	10E 5% safety res
R441	4822 116 81861	6.8E 5% safety res
R481	4822 100 11527	22K LIN TRIM
R482	4822 100 11527	22K LIN TRIM
R492	4822 100 11071	10K LIN TRIM
R499	4822 100 11071	10K LIN TRIM
R722	4822 116 81985	100E 5% safety res.
R751 R752	4822 102 10407	Potm. 2x20k (level)
R757 R758	4822 102 10406	Potm. 2x20k (balance)

Miscellaneous

4822 249 10384	PB. Head Deck A
4822 249 10385	REC/PB/ERASE Head Deck B
4822 361 21246	Motor Deck A
4822 361 21246	Motor Deck B
4822 242 72604	CER. resonator.95 Q401

(GB)
Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

(D)
Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Originalzustand des Geräts darf nicht verändert werden für Reparaturen sind Original-Ersatzteile zu verwenden.

(NL)
Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde worden toegepast.

(I)
Le norme di sicurezza esigono che l'apparecchio venga rimesso nelle condizioni originali e che siano utilizzati pezzi di ricambiago identici a quelli specificati.

(F)
Les normes de sécurité exigent que l'appareil soit remis à l'état d'origine et que soient utilisées les pièces de rechange identiques à celles spécifiées.